RAILROAD GAZETTE

FRIDAY, APRIL 25, 1902.

CONTENTS

ILLUSTRATED:
The Atlantic Avenue Improvements of the Long Island Railroad 298
Consolidation Freight Locomotive — Norfolk & Western Ry. 302
Daly's Train-Resistance Computer 304
Some New Ideas in Triple Valve Repairs 305
The Jenings Collapsible Ice Tank 306
60,000 lbs. Stock Car of the Illinois Central 307
Consolidation Switching Locomotives for the Chicago Union Transfer Ry 307
An Improved Sand Dryer 310
EDITORIAL:
The Right to Route Your Freight 308
Concerning Rails 308
Annual Report; Lake Shore & Michigan Southern 308
American and British Locomotives in Egypt 308
Editorial Notes 309
MISCELLANEOUS:
Passes to the Conventions 297
Track Elevation in Newark, New Jersey 297
Gage on Curves 300
Rhode Island Railroad Commissioner's Report 300
Coaling Stations and Water Tanks 300
New Railroad in Greece 303
Illinois Central's Waterloo Shops Closed 305
A New High Speed Record 305
Erecting Bridges in the Colonies 305
An Acetylene Gas Exhibition Car 306
The First Government Accident Report 309
The *Railroad Gazette* Train-Accident Records 310
Electric Competition on the Boston & Maine 310
GENERAL NEWS:
Technical 310
The Scrap Heap 311
Locomotive Building 312
Car Building 312
Bridge Building 312
Meetings and Announcements 313
Personal 314
Elections and Appointments 315
Railroad Construction 315
General Railroad News 316

Passes to the Conventions.

In our issue of May 28, page 230, and again April 4, page 250, we spoke of the probable effect upon the attendance at the various mechanical conventions this year of the restrictions placed upon passes. Below is a letter which Mr. Rhodes (Assistant General Superintendent of the Burlington & Missouri River in Nebraska) has addressed to the President of the Master Car Builders' Association. The situation is not simple when one railroad, (and that a road not of the first rank so far as passenger business goes), has saved $1,000 a day by restricting and regulating this pass business. The managing officers of that road will be likely to think that it is their duty to let the conventions suffer, if suffer they must. It seems to us that the proper way out is for the railroads to designate officers who shall attend the conventions and if necessary pay their fare. This is a simple business proposition and puts the burden upon the man who is going to reap the benefit. If this is done we should say that the railroad companies would do well to be liberal and to designate a good many of their men to go to the conventions.

Mr. Rhodes says:

"We understand the principal Eastern railroads have decided that they cannot consistently give the members of the M. C. B. Association and Master Mechanics' Association transportation to attend their annual conventions this year at Saratoga. This, it seems to me, is very unfortunate. These two Associations have done more perhaps than any other organization in this country to build up the high standard of car and locomotive construction that we now enjoy. Not only does our equipment compare favorably with that of any other country, but the government has adopted some of our standards, in so far as safety appliances are concerned, and they now form part of the laws of the country.

"When the Executive Committees of our two Associations met and selected Saratoga for the place of meeting for the year 1902 they undoubtedly did so on the assumption that the same facilities for transportation would be given to the members of the Association and their families as have heretofore been given. Since this action was taken the Eastern roads have adopted new rules in regard to transportation, and it seems to me the Executive Committees for the good of the Associations ought to at once meet and reconsider their action. The gathering at Saratoga under the present conditions, in the opinion of many of the M. C. B. members, will be a very tame and poorly attended affair. This would be entirely obviated if the Executive Committees would decide on selecting some Western point for the conventions. Either Chicago or St. Louis have ample hotel accommodations for all the people the Associations can get together. The recent successful gathering of the American Railway Engineering and Maintenance of Way Association held at the Auditorium Hotel, Chicago, has shown clearly that it is not necessary to go East for a successful convention. We always have felt that the Western members hardly got the attention that they ought to have in so frequently holding our annual conventions in the East. There never will be a better opportunity to give the Western members a little attention than now offers, and as voicing the opinion of a good many Western members we would urge that the Executive Committees reconsider their action and select some Western town within the pass territory for the June conventions.

"The above is not written with the idea of any criticism of the action the Eastern roads have taken on the pass situation. It is written solely in the interest of having a large and profitable gathering at the mechanical men's annual conventions. This would seem to be best served by holding the meeting at the extreme limits of the new pass territorial districts."

Track Elevation in Newark, New Jersey.

LACKAWANNA.

The Delaware, Lackawanna & Western has taken steps towards fulfilling its part of the contract of changing and elevating its tracks through the city of Newark, N. J. Several blocks of old buildings, which stand on the road's new right of way, are being razed, and within a short time the actual work, according to plans and specifications which have, for some months, been drawn up, will begin. It is expected that it will take about three years to complete the work, and that the cost of it, to the railroad, will be something over $3,000,000. It will mean the abolishment of practically all grade crossings in Newark, for, since the summer of 1901, both the Pennsylvania and the Central Railroad of New Jersey, have been elevating their tracks, which work is now near completion.

For some years the officers of the Lackawanna have recognized the necessity of a radical change in Newark. In the heart of the city the road has a maximum grade of 3 per cent., and it has a sharp curve, terminating at the Broad street depot, which faces one of the busiest thoroughfares of the city. To quote from the Newark *Sunday Call* of March 9 last:

"The danger of a train breaking in two on the heavy grade between Broad and High streets is ever present. Really, there is more danger to trolley cars after a train has started up the grade than when a locomotive is approaching. Scores of trains have thus broken loose since the Morris & Essex road was opened."

On Dec. 20, 1901, the Board of Street and Water Commissioners of the city of Newark passed an ordinance authorizing a contract with the railroad for elevation, depression and change of tracks. This contract provided, in brief, that the Lackawanna should inaugurate the changes, assisted financially, to the extent of $600,000 by the city; all damages incident to the changes to be borne, in the first place by the railroad company, the city, however, refunding later 50 per cent. of the amount of such damages. Various streets were to be closed by the city, and both the municipality and the railroad agreed to surrender, each to the other, certain strips of real estate.

After crossing the meadows the road passes through Harrison, crosses the Passaic River, enters Newark on a trestle and takes a sharp curve until High street is reached, a distance of five city blocks. From High street the road is straight, although with a grade of 1.60 per cent. Here, for some distance, the tracks are laid in the middle of a street. The entire length of the road within the city limits is one mile.

It was at first the intention to elevate and depress, immediately, the whole right of way. This, however, is impracticable as yet, for at the extreme top of the heaviest grade is the Morris & Essex Canal. The New Jersey Legislature will, in its next session, take measures to have this canal declared abandoned and have it filled in. Until this is done, however, the Lackawanna can make no provision for elevating or depressing between High street and the canal; consequently the immediate work to be pushed is this:

Elevation will begin at Harrison, and in that city the new tracks will be laid so that they will meet the Passaic bridge at a point 30 ft. north of its present site. The bridge, which was put in six months ago with this end in view, is a steel triple deck structure. The present passenger tracks are now laid on the center deck, but the new tracks will run over the top deck. The bridge will be lowered 12 ft. and a new draw put in. From the bridge the new right of way will be in an almost straight line, meeting the present rails at High street. The latter street will be depressed 8 ft. 2¼ in.

The present principal Newark depot of the road, known as the Broad street depot, and its adjacent yards cover an entire block. This, as a passenger depot, will be abandoned. The property, however, will be held, walled in, freight and express houses built and six track sidings laid. All these freight tracks will come over the relocated bridge at a point where the passenger tracks come at the present time. The main tracks of the road will just touch the northeast corner of the new yards, while now they pass through its southwest corner. At the point opposite the present depot, the new grade will be 250 ft. to the northward. One street, at this point, will be entirely relocated by the city and one closed for all traffic.

A new depot will be built one block from the present structure. It will be built on both sides of the tracks, the east and westbound waiting rooms connected by a tunnel, and will be a model of convenience. There will be a well-laid park on one side of it, while covered walks will connect it with the streets.

Awaiting legislative decision as to the canal abandonment, the Lackawanna will run on its present tracks and grade from High street to the canal when it will again elevate. Tracks will be 20 ft. above grade at this point, the height gradually decreasing, however, as another heavy grade is met with. At the Roseville avenue depot the road will be depressed, and this depression will continue both on the long distance and Montclair branches which converge at this point, to a distance 500 ft. beyond the city limits. A number of streets will be closed to vehicles, the city building iron foot bridges over them.

This work, when completed, will mean the elimination of every grade crossing, along this road, in the city. Although expensive it must be done, for the Lackawanna's suburban traffic is constantly increasing, and express trains now are, during the rush hours, sometimes run on a headway of less than two minutes, through a busy city and down heavy grades on the street level.

PENNSYLVANIA RAILROAD.

A year prior to the passing of the D., L. & W. ordinance, that of the Pennsylvania and Central roads went through the Newark Board of Works. This provided that the Pennsylvania should elevate all its tracks for a distance of 10,720 ft. within the city limits, thus eliminating all grade crossings along that road also. Steel bridges spanning the entire street and resting on stone abutments built on the north and south sides of each crossing were required, tracks to be laid on retaining walls with solid filling, and the entire cost of elevation, filling, stone and bridge work to be borne by the company. The same provision governed the Central Railroad of New Jersey, saving that it was obliged to elevate a distance of but 3,000 ft. In return the city agreed to vacate certain streets, stand one-half the damages incident to closing the thoroughfares, and to pay $600,000 towards prosecuting the work.

The more difficult portion of the work fell, of course, upon the Pennsylvania. After leaving Harrison, westbound, the road enters Newark over the Passaic River bridge. To properly raise its tracks, the elevation extended far into Harrison, and through Newark, to a point near the western line of Newark. The Passaic River bridge must be raised, two depots built, a short, sharp curve, found directly after crossing the Passaic River, lightened, and all this without disturbing the heavy traffic of the main line.

Within 60 days after the passing of the ordinance the surveys were completed and actual operations begun. The north retaining wall and the north half of most of the street bridges are nearly finished from the western end of the elevated to the C. R. R. of N. J. overhead crossing. The retaining wall is of rock faced broken range work with a course of coping projecting beyond a string course. The west track has been elevated on a temporary trestle, and the bank is being filled with earth carried over the trestle. By this system there is no interference with regular trains.

Architects are planning the new and remodeled depots. It is probable that the main depot at Market street will not be greatly altered. Trains will come in on a level with the upper windows, and passengers can then descend to the main floor by broad stairways.

It is estimated that the work will cost the Pennsylvania about $2,000,000. B. M. and J. F. Shanley, of Newark, have the general contract.

CENTRAL OF NEW JERSEY.

The Central Railroad's elevation, although calling for an outlay of but $300,000, is a fine piece of engineering. Retaining walls, in some places 30 ft. high, have been erected, a 260 ft. steel viaduct built where the Central crosses the Pennsylvania's tracks, steel bridges spanning a number of streets have been built, and the entire terminal facilities revolutionized.

In April, 1901, this work began, under the supervision of Mr. A. E. Owen, the assistant engineer of the road, and by June 1st the concrete work was started. Burke Bros., of Scranton, Pa., secured the masonry contract, which called for 25,000 yds. of excavation and 22,000 yds. of concrete; in one day 370 yds. of hand-mixed concrete was laid.

Some difficulty was experienced at Mulberry street, which is a trolley crossing. Here the railroad's elevation was 6½ ft., while the city depressed the street 6 ft. A temporary wooden bridge was built which is now being superseded by a steel structure, 63 ft. wide, resting on stone and concrete abutments with steel columns along the curb line. It is a through girder bridge with tight floors.

At the Pennsylvania's tracks the Central was obliged to make sufficient elevation to give a 16 ft. under-clearance from the top of the former road's rail, as figured from its new grade, giving a total elevation at this point of 40 ft. 9¼ in. above the city datum line. Work on the temporary trestle was begun Aug. 15, 1901, and completed Oct. 5 of the same year. The bottom was soft and 25 and 30 ft. piles were driven on which the trestle was built. At the west end of the bridge is a stone abutment, which is to be retained and raised to grade with concrete. The abutment at the east end is entirely of concrete. The permanent bridge, just put in place, is of steel and of the plate girder type. E. B. Jenks Co. built the temporary trestle, while the American Bridge Co. has the structural bridge work.

As the track elevation advanced the company decided to make larger terminal improvements. Consequently a couple of months ago a new inbound and outbound freight station was started by the E. M. Waldron Co., of Newark. It is of brick, two stories high, and will cost

$37,000. This is about completed. Plans for a new train shed are also made. The present sheds are too small for the purpose, and are entered on a 3 per cent. down grade. Tracks leading to the new building will conform to the high grade.

Other innovations will be the interlocking of the yard switches, a new U. S. Express house and a new depot. These will follow the track improvements, which should be complete by the middle of June.

Mr. Ernest Adam and Mr. Wm. A. Howell, of New Jersey, have supervision over the railroad work in behalf of the city. They are assisted by Mr. Wainwright Ripley.

CLARENCE H. BAILY.

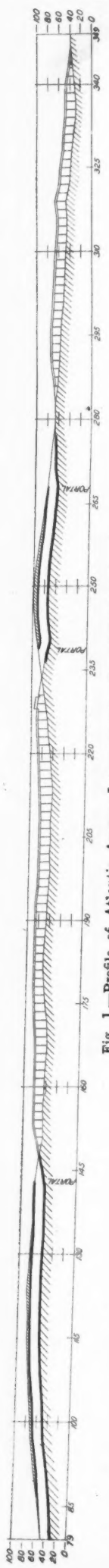


Fig. 1.—Profile of Atlantic Avenue Improvements—Long Island Railroad.

The Atlantic Avenue Improvements of the Long Island Railroad.

For many years the tracks of the Long Island Railroad leading to the Flatbush avenue terminal in Brooklyn have been laid on the middle of Atlantic avenue. This was not the original survey of the road, for the tracks were first located outside the street limits over a private right of way. In 1867, however, the city gave the company a right of way through the center of the street in consideration of a surrender of its own property. As the city grew a means of guarding the tracks from the street traffic became necessary and a light iron fence was erected on either side with gates at all street crossings. When the road was first built it ran to the terminal through practically an open country, but now the city has extended so that the tracks are faced by almost unbroken rows of houses from the Flatbush avenue station to beyond East New York, a distance of about four miles and a half. Under these circumstances a change of grade became both desirable and necessary.

About three years ago the engineering department of the railroad began the work of preparing the plans for those changes which are now in execution, and by the terms of the Wagner Bill that passed the New York Legislature in the spring of 1901, the removal of these tracks from the street grade became a law. The work indicated in the bill is to start at Fort Green Place and extend to the city line, a distance of 30,525 ft. The former point is the western terminus of the line and is known as the Flatbush avenue station.

The tracks are at present laid on the surface of the street (Atlantic Avenue), and follow its profile out to Jamaica with no attempt at easement either with cut or fill. As there is a rapid rise in the ground just east of the Flatbush avenue station, as well as at several other points along the line, there are some tolerably heavy grades encountered, varying from 0.70 to 1.70 per cent. for the first 3,600 ft. These will be materially modified in the new profile, although there will be no great variation from existing levels either in subway or elevated construction.

The improvements will consist in an alternate subway and elevated railroad for 26,700 ft. east of the Flatbush avenue terminal. At the station the road will be depressed and pass through a subway for 8,400 ft., when, by a rise on a grade of 2 per cent., it will run out on an elevated structure, by which it will be carried for 9,600 ft., again dropping down into a subway by a 1.90 per cent. grade and continuing therein for 2,400 ft. On leaving this short section of subway it rises to the street grade and connects with the present tracks at Manhattan crossing, where the Coney Island line branches off. To the east of this point the tracks will again run on an elevated structure for 5,800 ft. to the end of the improvements.

In this new profile the heaviest adverse grades are those where the line passes from the subway to the elevated structure, and there runs from 1.5 to 2 per cent. They are, however, short and may be worked as momentum grades in every instance. In the case of the other grades they will be less than those of the existing line, though moderately heavy.

Starting from the terminal at Flatbush avenue there will be a rise over a 1.2 per cent. grade for a distance of about 2,000 ft., which is then eased off to 0.8 per cent. for the next 1,100 ft., dropping to .58 per cent. for the next 900, and thence over a practical level to the east portal. On the first elevated section there are three short distances of 0.5 per cent. grades with virtual levels for the balance of the distance. In the second subway there will be three short sections where the grades are to be 0.8, 0.65 and 1.0 per cent. respectively, while on the second elevated section there will be a short section of 0.6 and 0.9 per cent. grade each with a drop of 1.48 per cent. to the present tracks.

Fig. 1 shows in very general outline a vertical section of the improvement from which an idea of the profile can be obtained. It will be seen that, as already stated, there is but little difference in the surface and rail levels, a fact that will aid the economical execution of the work. In this profile, Fig. 1, the heavy lines bordering the subway at top and bottom indicate the concrete of the structure. The elevations above the datum line are indicated in feet by the vertical scale at each end of the profile, and the horizontal distances by the station numbers below. The single station distance is 100 ft. as usual.

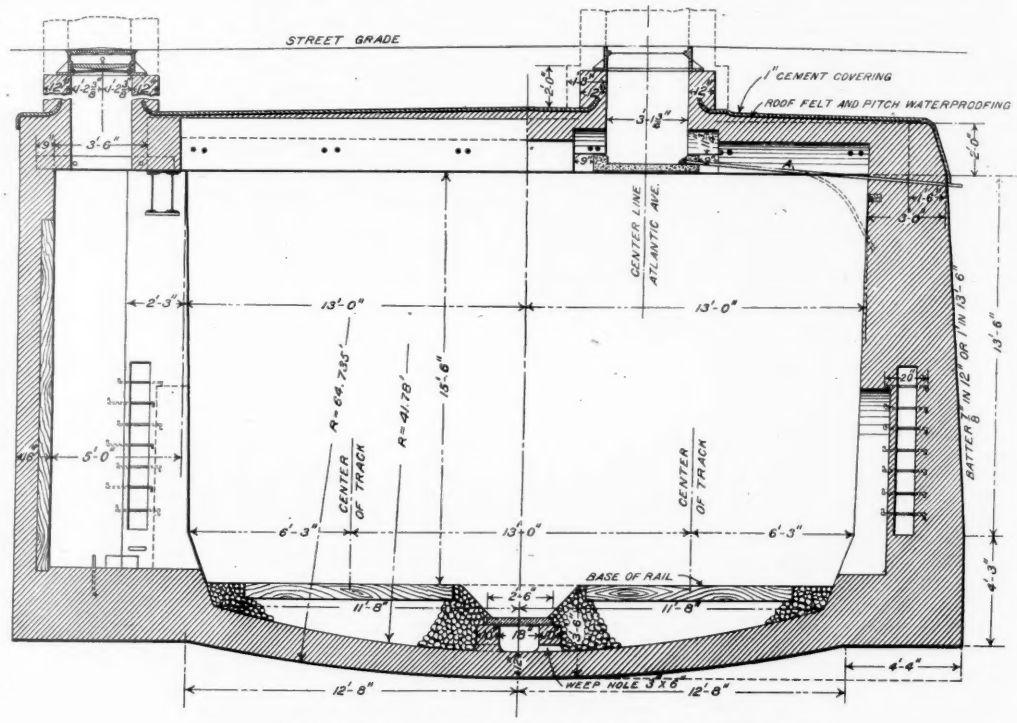


Fig. 2.—A Typical Cross Section of the Atlantic Avenue Subway.

The work is planned for a double track throughout and is intended for through traffic. It is not intended to cater to or bid for local traffic, as it is the desire of the railroad company to leave this entirely to the surface electric lines. There will, however, be three stations between Flatbush avenue and Jamaica. The first will be between Nostrand and New York avenues, extending from stations 153 to 159; the second at the present East New York station at 280, and the third at Warwick avenue at 327. The first and third of these will be on the elevated portion of the work, and the second at the grade level of the street between the second subway and second elevated.

The excavation will be through gravel throughout. There is no rock work, though boulders of any size from a mere pebble to that of a small house may be encountered at any point. It is, therefore, necessary that the sides of the subway should be protected by retaining walls of ample strength, not only to resist the side pressure of the gravel, but also the weight of the roof beams and their load in the street above.

Fig. 2 shows a typical section of the subway. From this it will be seen that the center line is 4 ft. 6 in. out of the center of Atlantic avenue. This displacement is due to the presence of a 48-in. water main that is laid just outside the present line of tracks, and which parallels the subway and encroaches upon the retaining walls in some places. The subway invert and retaining walls will be of concrete, which in massive constructions of this character will consist of one part by volume of Portland cement and eight parts by volume aggregate of stone, gravel and sand. The roof is carried by plate girders, or 24-in. I-beams, according to location as shown in Fig. 3. The roof itself is formed of concrete arches as also shown in the same illustration.

The subway is fitted with conduits on each side for carrying the electric cables, and access is gained to these both from manholes that can be entered from the street as well as from the subway itself. This is clearly shown at the left of the section given in Fig. 2. The manhole opening has a clear diameter of 2 ft. 4¾ in., and at the bottom will be backed with a strip of 3 in. by 6 in. creosoted pine set into the concrete. The side walls through which the conduit passages will be laid, are to be bonded with fork-ended bonds of ⅛ in. by 2 in. iron set staggered, and 36 in. from center to center with lips as shown in the engravings.

The roof of the subway is to be protected by a layer of roofing felt and pitch water proofing over which there is to be a 1-in. cement covering. The ventilator shafts which stand along the center line of Atlantic avenue, and 4 ft. 6 in. out of the center of the subway, are so arranged as to cut down the dripping of water to a minimum. They are to be carried up to and flush with the street level and capped with a cast-iron grating. The interior of the shaft, 3 ft. 1¾ in. in diameter, is to be water-proofed by being swabbed with hot pitch. The bottom will be formed of a slab or basin of granitoid or cement laid on a sheet of expanded metal of No. 3 mesh and 10 gage thickness. This basin will extend across from one plate girder or I-beam to another and thus be self-supporting. The ventilation is to be accomplished through the side openings shown on either side in the section. The drainage of the basin will be through a 1½ in. galvanized iron pipe (A) protected by a strainer and leading out through the side walls to a French straw drain.

At intervals of 15 ft. between centers, refuges will be built in the side walls. These will have a depth of 15

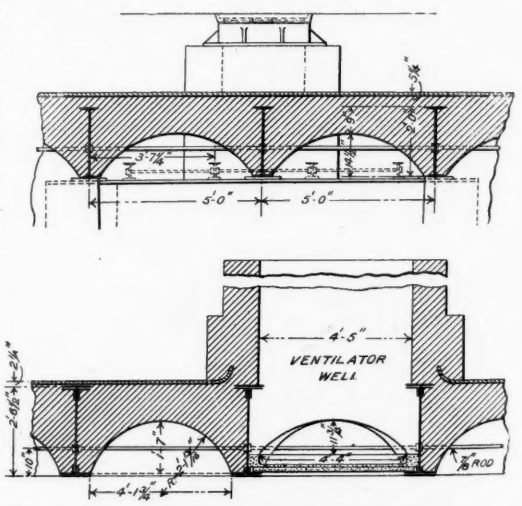


Fig. 3.—Longitudinal Sections of Subway Roofs Showing I-Beam and Plate Girder Construction.

in. from the inside face of the wall, a height 7 ft. and a width of 3 ft. 6 in. The advantage of this construction and arrangement of conduits is that the wires may be repaired either from the manhole or the subway; or the cables may be drawn into position from a reel on the street or a car standing on the tracks.

The bottom of the subway will be formed by an invert having external and internal radii of 64.735 ft. and 41.78 ft. respectively. Near the center of this invert there will be two curbs 10 in. wide and 12 in. high capped by a flag 3 in. thick and with a minimum width of 30 in. and length of 24 in. The space thus formed will form a ditch for the drainage of water accumulating in the broken stone ballast, and which will enter the drain through 3 in. by 6 in. weep holes spaced 2 ft. apart from center to center.

The drainage of the subway has been carefully provided for. For a greater portion of the length the water will be led back until it can be made to flow by gravity

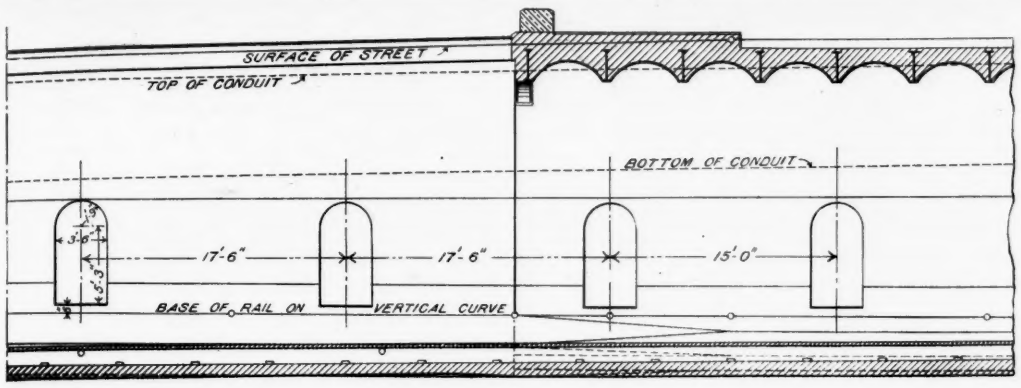


Fig. 4.—Section of Open Cut and Tunnel.

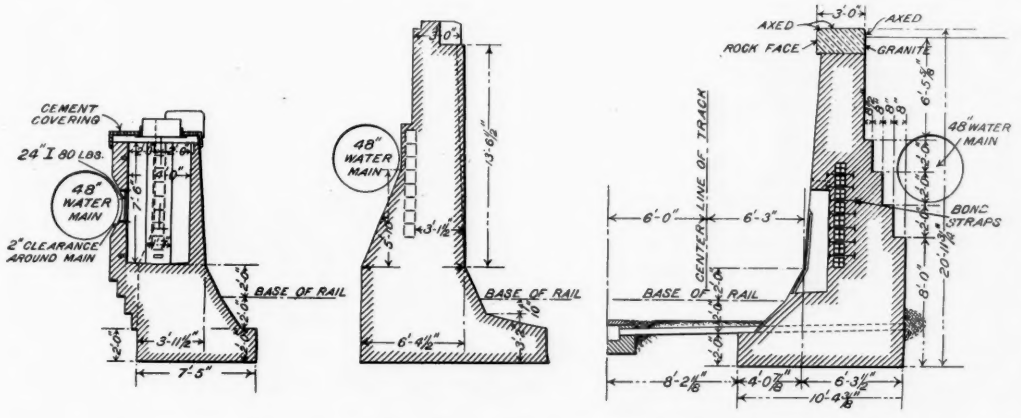


Fig. 5.—Typical Section of Side Walls of Open Cut of Atlantic Avenue Improvement.

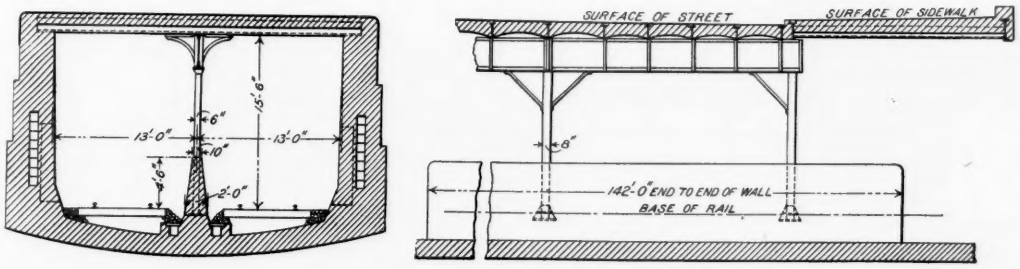


Fig. 6.—Sections of Subway with Limited Head Room.

into the city sewers. Where this is impossible pipes are to be led out through the masonry to the soil beyond where a French straw drain will be provided and the water be allowed to seep away. This is possible on account of the porous nature of the soil, as already noted.

The side walls of the open cut work will be built of second-class bridge masonry, with granite or other hard stone coping, surmounted by an iron fence. This stone work will be carried back into the subway for a distance of 50 ft. from each portal, as indicated in Fig. 4. This illustration also shows the means employed to obtain the maximum of head room at the portals by the elevation of the sidewalk and granite coping at the edge.

Fig. 5 shows a few typical sections of the side walls and illustrates the cramped position in which the engineers found themselves in connection with the 48-in. water main alluded to above. In the left-hand section at a manhole opening the wall is curved in, allowing 2 in. space between it and the pipe. This curve is, in some cases, protected by waterproof felt. It has sometimes been necessary to make a different disposition of the conduits, though the vertical arrangement is followed in the subway and walls. It will be noticed that these are eight in number. They are below the surface throughout the whole length of the route, though in connection with the elevated structure they are arranged either four deep and two wide, or two deep and four wide. Furthermore, by placing them upon each side of the tracks a provision is made against a total crippling of the traffic by injury to one set of conduits.

The section of the subway given in Fig. 2 is typical of what is used throughout except for a distance of about 200 ft. at the eastern end of the western subway near station 142. Here the work is so cramped for head room that a row of columns is placed in the center between the tracks as shown in Fig. 6. A plate girder carried by 6 in. by 8 in. columns is to be placed along the center line of the subway. This carries the roof I-beams 12 in. deep. At the right of this illustration is shown the ingenious means by which the elevation of the side walks and an auxiliary means of supporting the same are made to contribute to the head room at the portal.

In order to avoid wreck from a derailment these columns are to be protected at the bottom by a concrete wall 4 ft. 6 in. high extending out beyond the end columns to a distance of 9 ft.

Turning now to the elevated portion of the structure, there is little to be said. It is shown in the two typical sections of Fig. 7, where the four-track and double track constructions are illustrated. Here will also be seen the alternative arrangements of the conduits to which attention has been called. The structure itself is of the plate girder type carried on built-up columns formed of an I-beam and two channels rivetted as shown at the right hand side of the four-track section. The usual guard rail and tie fastenings obtaining on similar elevated structures elsewhere will be used, and the columns will be footed on suitable masonry foundations.

One of the objects which the engineers have kept in mind has been to reduce the variations in size and shape of the girders and other parts to a minimum. This has been done with such success that the duplicate parts are numbered by the hundreds. Thus in one case there are 715 girders exactly alike. This has necessitated a great deal of care and study but has been amply repaid by the savings effected in the construction.

As previously stated there are to be three stations between the Flatbush avenue terminal and Jamaica, and of these two will be on the elevated structure. They will both be island stations with approaches from the middle of the street. The arrangement that has been adopted at Warwick avenue is shown on the next page, in Figs. 8 and 9, of which the former is a cross-section showing the tracks, elevated structure and station platforms, and the latter is a plan and side elevation.

The details of the cross-section speak so clearly for themselves as to need no explanation. In the case of the plan it will be seen that not only is the station platform itself above the center of the street, but the stairway and approaches start from the ground immediately beneath. Where the street is occupied by the tracks of electric roads, this arrangement necessitates their deflection as shown in the plan of Fig. 9. It is not expected, however, that this will be a permanency, since, with the growth of the city and the consequent increase of street traffic, it will, in time, be necessary to remove the obstructing stairway. Provisions have been made for doing this and then the platforms will be located outside the tracks.

These are the main general features of the work, though, of course, in an undertaking of such magnitude there are a number of auxiliaries that would, if standing alone be well worthy of attention. Such cases are the sidings and connections, and especially is this true of the Carlton avenue freight yard that is to be depressed as an open cut with connections to the subway.

It will be remembered that when these improvements were first brought to the attention of the public, it was proposed by the Long Island Railroad to construct a low-level tunnel in extension of the Atlantic avenue improvement beneath the East River to a point at or near the corner of Cortlandt street and Broadway in the Borough of Manhattan. This part of the scheme has been abandoned and it is the present intention to have the improvements forming the subject of this article serve as an extension to the tunnel which the New York Rapid Transit Commission will cause to be built down Broadway, beneath the East River and out to the Flatbush avenue station.

The contracts for the work have been let and ground has been broken. The steel work of the elevated structure has been let to the American Bridge Company, and the contract calls for the delivery of about 17,000 tons of material. The work has been divided into four divisions embracing respectively the two subways and two

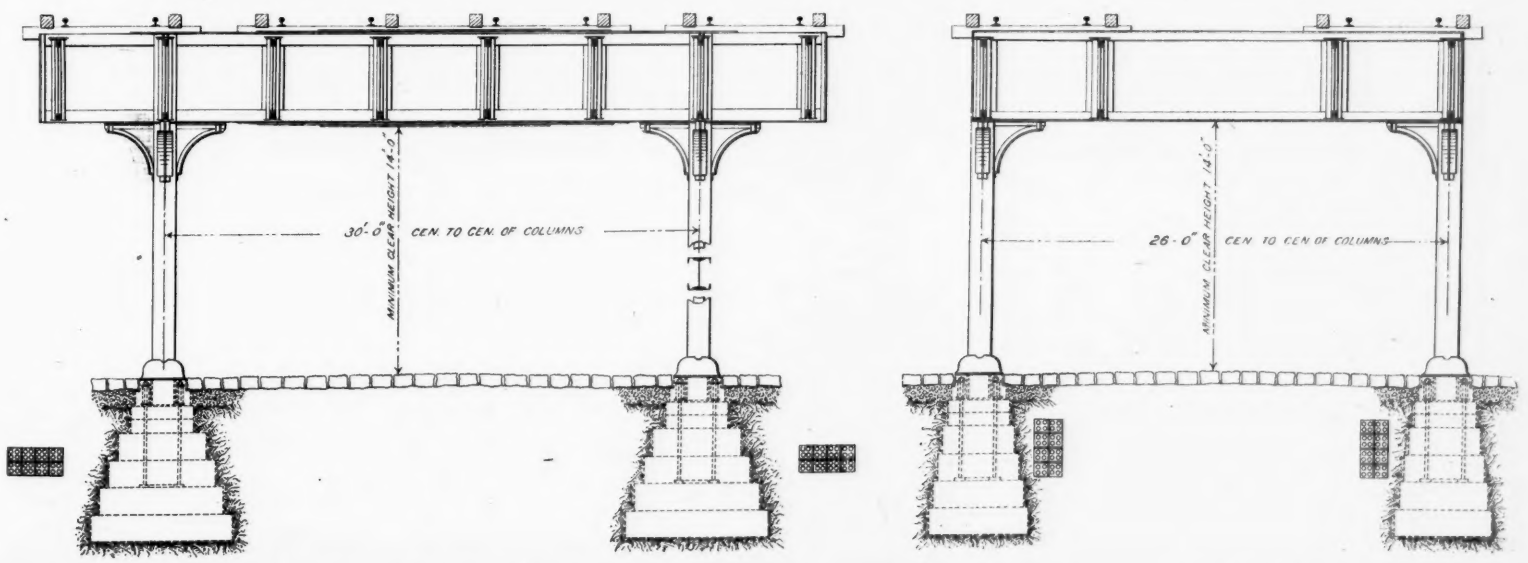


Fig. 7.—Typical Sections of Four-Track and Double-Track Elevated Sections of Atlantic Avenue Improvements—Long Island Railroad.

sections of elevated structures, and the contracts have been awarded accordingly. The first division, embracing the western subway starting at the Flatbush avenue station, has been taken by Wilson J. Bailey, whose work will also include the depression of the Carlton avenue freight yard. John C. Sheehan has the contract for the excavation and mason work of the second and third divisions, which includes the U abutment masonry, the side walls of the open cut work, a two-track elevated structure, and the second subway. The contracts for the fourth division have been given to the United Engineering & Construction Co., for the conduit, and to John McNamee for the masonry.

It is estimated that these Atlantic avenue improvements will cost about $3,500,000, of which the city will pay $1,250,000, and that it will require two years for the execution of the work.

When completed it is expected that this route will afford a means of rapid transit from the suburban towns on Long Island into New York. The running time from Jamaica to Flatbush avenue will be 20 minutes as against from 25 to 35 under existing conditions. To this must be added about 10 minutes for the run through the proposed tunnel of the Rapid Transit Commission, to the Borough of Manhattan, making 30 minutes for the whole distance as against at least twice that time under existing conditions.

The road will, of course, be operated by electricity, the details of which have not yet been fully developed. The surveys and plans for the work have been executed under the supervision of Mr. J. V. Davies, of the firm of Jacobs & Davies, as Chief Engineer.

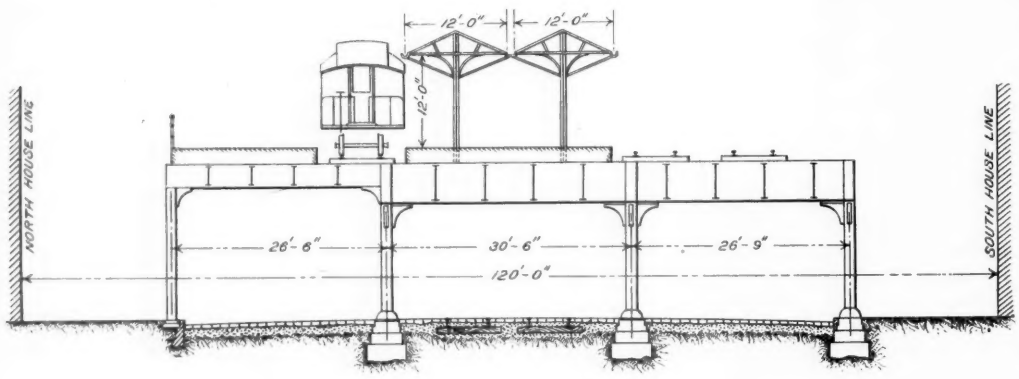


Fig. 8.—Island Station at Warwick Avenue—Atlantic Avenue Improvement.

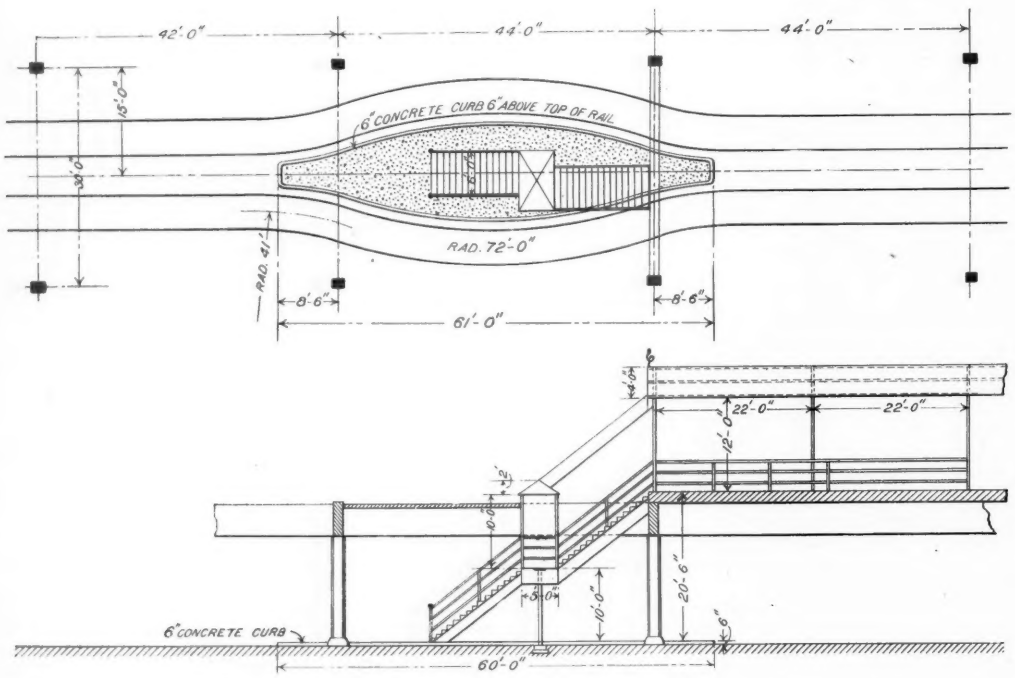


Fig. 9.—Plan and Side Elevation of Island Station, Warwick Avenue.

Gage on Curves.

At the Maintenance of Way Convention Mr. W. B. Poland (B. & O. Southwestern) said: "In the report of the Committee on Track we ask that a special committee be appointed to consider the subject of widening of gage on curves. That is new ground, which it is expected that the Committee on Track is to cover, but it is such a large subject and requires such special investigation that it seemed to our committee that it should be considered by a special committee, for the reason that it involves motive power. It seemed to us that it would be better to have it considered by a joint committee of the members of the Master Mechanics' Association with a committee of our own Association.

"We should also like the committee to consider the subject of what is gage; meaning by that to consider what is gage in the case of a worn rail on a curve. We are all familiar with the way in which the contour wears on curve rails. It is worn always on an incline. Now, if you have a long fitting on the gage with which you measure, you will get a shorter distance between the rails than if you have a short fitting. It is a matter which our section foremen are not well posted on. They do not know what gage is on a curve; their ideas are different; and in talking to engineers, even, I find their ideas are quite different. It is also a matter that depends a good deal on the flanges of the wheels and should be considered jointly, with the Master Mechanics' Association."

Mr. McDonald (in the chair) said: "I hardly think the members are familiar with the requirements of the constitution relating to special committees. A resolution to appoint such committee may be presented by letter at any time to the Secretary of the Association, if signed by 10 active members, and must be referred by him to the Board of Directors, which may appoint such committee. If the Board of Direction should not deem it expedient to appoint such committee, the members requesting the appointment of such committee shall be notified, and the matter will then be referred to the Association at its next annual meeting and decided upon by ballot."

Rhode Island Railroad Commissioner's Report.

Railroad Commissioner Edward L. Freeman, of Rhode Island, has issued his annual report for the year ending December 31. The first few pages are taken up with a general discussion of the railroad industry. Among other things, the Commissioner says, that, in view of the large number of collisions lately occurring in this country he has sometimes thought that in multiplying safety appliances the railroads have given insufficient attention to the character and qualifications of the persons selected to safeguard the trains; and then he goes on to give what amounts to a puff to a new block signal invention.

The report gives the usual statistics. The Commissioner has inspected the railroads of the State and gives notes on the principal improvements being made. Of the 126 station buildings in the State he finds very many which are not kept in good order; the floors and woodwork are dirty, and it is almost impossible to see through the windows. There has been a deterioration in this respect during the last two or three years.

All the personal casualties occurring in the State during the year, on both steam and street railroads, are reported in full with the names of the persons killed or injured; and this matter fills over 40 pages. Although the Commissioner's powers are not extensive, and his State is a small one, the report is fully abreast of the times in its pictorial feature. There are a dozen or two of full-page half-tone engravings showing bridges, shops, power houses, express cars for use on electric roads, and the McMyler coal hoisting machine.

Coaling Stations and Water Tanks.*

The Committee on Buildings selected from the topics assigned to it two subjects for consideration in the general schedule, namely, "Coaling Stations" and "Water Tanks."

COALING STATIONS.

The principal factors for consideration under this head may be enumerated as follows:

First.—The location may determine largely the nature of the plant to be used. Where large quantities of fuel are to be handled with only a limited amount of room for the construction of tracks and buildings, an expensive mechanical plant may be fully justified. At other points where land values are small, a totally different style of plant may be the most economical.

Second.—The quantity of coal to be handled will largely influence the character of the plant to be constructed.

Third.—A third consideration is the cost of operation.

Fourth.—A fourth consideration will be the amount of first cost, and also of the cost of repairs and renewals.

Fifth.—In the same connection, a true comparison will require a consideration of the interest on the cost of the investment, and this also should be reduced to an equivalent value of cents per ton of coal handled.

Sixth.—Complicating with all of the above is the question of storage. This is a matter of great importance, and it usually receives but little consideration.

Seventh.—The kind of coal handled will also influence the decision—whether it be anthracite or bituminous, or both.

Eighth.—The facilities which each company has for delivering coal to its coaling plants will tend to make the situation more involved, since coal may be handled in box cars, gondola cars (with stationary or with movable sides or traps), side-dumping or bottom-dumping cars, and other varieties.

In order to determine what progress up to date had been made in the solution of this problem, the committee sent out a circular requesting information as to "recent practice in the construction of coaling appliances."

Descriptions of a number of general types of coaling stations, together with illustrations, are included in the report. Ten types are described, beginning with the simplest possible arrangement, where the coal is delivered on an elevated platform. It is then loaded into barrows or cars, rolled to the edge of the platform and dumped into the tenders. The plans grade up through the various types having inclined tracks and pockets, storage facilities, etc., to the latter day types, where the coal is dumped into track-hoppers and elevated to overhead pockets or to storage bins by conveyors. In general no details were given of the cost. Out of the forty odd replies received, twenty-eight companies use coal chutes of one or another kind for the delivery of coal to their engines. Twenty-eight get the coal up to these chutes by means of inclines. A few have no better means of coaling tenders than to shovel the coal directly from the cars, or at least this is to be inferred from the fact that they do not list any better method. Less than one-fourth of the whole number have adopted any of the mechanical appliances for handling coal. A large proportion have no improved method for storing coal, and of these not all have any machinery for moving the stored coal either to chutes or to tenders for use. But very few make a practice of storing coal in any large quantities, but depend either upon storage in cars, or small piles placed either upon the ground or upon storage platforms as the only alternative to handling direct from cars through chutes or otherwise to the tenders. The statements of cost, as already alluded to, are very incomplete, and those that are given are somewhat indefinite. The rates named cover a wide range and but little can be learned from the study of the distribution given. It is not made entirely evident that the mechanical appliances for handling coal are always economical; in fact, the least rate at which coal is reported to be handled in any of these plants is where coal is delivered in dump cars, and is dumped directly to chutes, reported to cost only one-half cent per ton for the delivery from cars to tanks or tenders.

The Committee is unable from the data which it has now obtained to make any decided recommendations in regard to the adoption of coaling plants. The data at hand are too vague, and the data as to cost of operation are insufficient to permit any sound opinion to be formed at present. The following general conclusions may perhaps be safely stated: In proportion to the amount of coal to be handled yearly, railroad companies will be justified in the construction of more and more expensive coaling plants. The simpler types are inexpensive in first cost and in maintenance, but more expensive in operation; that is, in the cost of labor, and it would be feasible that, with accurate information as to cost of original

*Extracts from the Report of the Committee of the American Railway Engineering and Maintenance-of-Way Association.

construction, cost of operation and cost of maintenance, one could calculate with reasonable accuracy at what yearly rate of coal handled it would be economical to build mechanical plants; but the improvements which are being made from year to year in the details of construction and methods of operation of mechanical plants and the lack of sufficient data as to the items of cost above named make it impossible to give anything more than a general suggestion as to the point where the simpler should give place to the more complex mechanism. At present it seems probable that where a coaling station handles a yearly amount of fifty thousand tons, a well-designed mechanical plant should operate economically, and this would be especially true if it should be desired to store any large proportion of the total amount of coal to be handled. The question of storage as already alluded to is a very vital one, and the importance of providing storage for coal is evident from the following considerations:

First.—It is unsafe to depend entirely upon the daily delivery of coal in coal cars for engine use. The uncertainties of transportation, the danger of strikes at coal mines, and of strikes, riots and other disturbances to transportation, make it almost absolutely essential that some storage should be provided for. This in many cases is accomplished by having a surplus of coal in transit, or held in cars at or near the coaling station and at large terminals, where it may be readily available for the company's use, in case of emergency.

Second.—The expense of storage of this kind, namely, in cars either at coaling points or at terminals, foots up to an enormous figure, if we consider the average valuation, or equivalent daily rental of each coal car. The approximate cost of this service on the Illinois Central is estimated at upwards of one-half million dollars per year.

Third.—The coal cars in ordinary service are most in demand for commercial business during the fall and winter months, and it is desirable to store coal at points remote from the mines during the summer months when this equipment is not in such great demand, and when the output of the mines can be transported and stored without competition from commercial business. Where coal is stored in open piles, either on the ground or upon rough platforms, it is expensive to unload this coal at the outset, and still more expensive to reload the same and to deliver it to the coal chutes (or directly to tenders) as may be desired. This expense can be enormously reduced by the use of a proper mechanical plant.

Fourth.—The deterioration of coal stored in open piles without protection is a very important consideration. Depending upon the climate and the amount of exposure, it is estimated that in a few months' time coal will lose from 10 to 25 per cent. of its value as fuel. This is partly caused by slacking or crumbling to pieces and partly by slow chemical change which goes on in the coal itself. The storage of coal in closed bins is frequently objected to on account of the risk from fire. It is believed, however, that, by taking the precaution to put only dry coal into store, and by designing the storage bins in such way that any portion of the contents may be drawn upon at will, also by providing means for determining whether the coal is heating, these objections may be overcome.

The Committee desires to call the attention of the members of the Association to the co-operation which each should furnish by the contribution of accurate data on this subject. It has in preparation, and will present in the near future, a circular containing a set of interrogations, which it is hoped, through the influence of members of the Association, will receive due consideration, and will furnish data which may be made available for the use of those members who wish to derive some immediate benefit from the investigations which are in progress by the several committees. It is perhaps not worth while at present to outline to any greater extent the scope of the inquiries which will be covered by this circular, further than to emphasize the importance of giving accurate description of some particular plant, with accurate data as to the cost of its construction, its operation and its maintenance. This would include also information as to the total number of tons handled at the station, the amount stored and the cost of the various steps in the process of unloading, storing and handling the coal.

RAILROAD WATER TANKS.

This report was a summary of replies to a circular letter sent out by the committee to various railroads. The object was to ascertain what is the general practice in construction now in use. The report includes a synopsis of this practice for each part of the tank, and a table, together with some drawings prepared for the same purpose. No standard plan was submitted, nor were any recommendations made.

The report is signed by H. W. Parkhurst, Illinois Central, Chairman; A. R. Raymer, Pittsburgh & Lake Erie, Vice-Chairman; A. S. Markley, Chicago & Eastern Illinois; C. T. Norton, Mexican International; B. C. Gowen, Wisconsin & Michigan; E. C. Macy, Chicago Great Western; H. W. Cowan, Colorado & Southern.

DISCUSSION.

Mr. Parkhurst: The committee has concluded that it would probably be better to read a small portion of the report, covering the conclusions to which we have come, so that they may be brought before you for consideration.

President Kittredge: The Committee on Buildings have devoted themselves to the consideration mainly of coaling stations and water stations, and we will consider that the subject of coaling stations is open now for discussion.

Mr. J. H. Abbott: We have on the Chicago & North Western two coaling stations which are very satisfactory. The amount of coal used at each station is about 30,000 tons a year, somewhere from 100 to 120 tons a day. The cost to us has been a little less than 2½ cents per ton. We have the Fairbanks & Morse.

President Kittridge: I would like to ask Mr. Abbott if the 2½ cents a ton includes the interest on the original investment and the cost of the maintenance of the plant.

Mr. J. H. Abbott: Yes, sir, it does.

President Kittredge: Your coal is handled from hopper bottom cars or shovel cars?

Mr. Abbott: From hopper bottom cars or side cars, and it is put directly into the pocket.

Mr. Poland (B. & O. S. W.): During the last year, on the division on which I am located, we have put up two coaling devices, which are practically the same capacity and seem to be rather interesting for comparison. One is a link-belt machine of a storage capacity of 500 tons, and of lifting capacity of about 60 tons an hour. It has four chutes, is operated by a dynamo; the power is obtained from a ship plant, so there is no power expended except when the machine is in operation. The cost of the plant was about $12,000. The other plant is one of slightly less storage capacity. I think there are 10 chutes on a side. It is of the incline type, in which the coal is dumped on top of the trestle. The coal is handled in both cases in side or bottom dump cars. The capacity per hour of the incline plant is probably a little greater than the elevator plant. Recently we made some rough comparisons of the cost. They were based on the expense of about three months' labor at the two plants. They included the interest on the investment and what we estimated would be the cost of renewal, and the annual repairs, and we determined as closely as we could from such calculation that the expense at both plants was practically the same, and as nearly as we could figure with only a few months to go on, about $2\,^{7}/_{10}$ cents per ton.

Mr. Hart: I would like to inquire about the difficulties in operating these plants, from some of the other gentlemen present, and would also like to state what difficulties we have found. The link-belt elevator chutes necessitate in most localities a very deep pit. In one of our plants we are troubled with water. If there is a sudden change of temperature it is apt to freeze unless watched closely. In another case when the temperature changes very quickly, and there is no night man at the chute, the undercut gate freezes tight.

Mr. H. F. Baldwin described the new coaling stations on the Alton (*Railroad Gazette*, March 14.)

Mr. Churchill: I would like to ask in regard to weighing of coal. I have made some inquiries about this recently, because we have just now the question of building new coaling stations. I have asked the question of a number of railroads, and find them gradually abandoning the weighing of coal. We used to weigh it, but we have for a number of years estimated the weight. Take the plant just described. When you are dumping coal into your engine, do you not have to stop the bringing up of coal into your chute?

Mr. H. F. Baldwin: We do, yes, sir.

Mr. Churchill: So with a terminal yard I don't see how that can be arranged.

Mr. Baldwin: The capacity of the machinery is 60 tons an hour, and our largest coaling stations use about 300 tons in 24 hours, so that it doesn't interfere at all with the handling of the coal.

Mr. Churchill: When you want to get 500 tons a day it is not economy to work the hoisting plant 24 hours. You would like to do your hoisting and storage of coal in 10 hours. Then if you do that you are brought down to stopping every time that you weigh out your coal. I want to know what the question is about weighing coal, whether it is disregarded by people in the Association as necessary to weigh coal, or as sufficient to estimate it?

Mr. Baldwin: I might say with reference to stopping the machinery that that does apply at intermediate stations where we have only one pocket. At terminal stations we have two, so as to take coal from one while dumping coal into the other. That does not interfere at all with the operation at the terminal stations. At the intermediate stations the consumption is about 200 tons a day, less than two hours work for the machinery. So that we do not consider that a serious matter at all.

Prof. Allen: In relation to the matter of weighing coal, I have had the opportunity within a year or two of hearing the matter discussed in a railroad club where the master mechanics or the people who deal with coal were at hand, people who were immediately interested, and the opinion advanced there seemed to be, that in order to get the best results with your locomotive engineers, you must not only weigh the coal, but it must be weighed in such a way that they would feel confidence in your results.

President Kittredge: It would seem to me, if you expect accurate information as to the performance of engines, it would be absolutely essential to know accurately the coal consumed, and so far as my experience and observation goes, those who give that branch of the service especial attention are particular in desiring coal to be weighed accurately.

Mr. Cushing: Mr. President, in regard to the matter about which Mr. Allen speaks, in roads where there is a coal premium in existence, or where a special record of coal consumption is kept, not only does the quantity of coal on the tank have to be taken when the run begins, but also after the run ends. As a matter of fact, what coal remains in the tank is not and cannot be weighed. The result is that in taking such records the tank is marked in such a way that the capacity of different depths of coal in it is given after proper calibrating in advance, consequently weighing of coal at coaling stations has no bearing whatever on that record. It is weighed on the cars at the mines and that is the weight on which the payment for the coal is based and therefore I really cannot understand the necessity for weighing it again. It is not an engine record as a general rule one is looking for, except in special cases. It is the man's record, and in order to get the man's record, the coal has to be measured and not weighed.

President Kittredge: Mr. Cushing's remarks seem to be pertinent provided the engine stops on one tank, and does not take any coal until the end of the run is completed, but if an engine starts out from one terminus with a full tank of coal and practically empties that and fills up the tank at one or two other stations before it reaches the other terminus, it would seem to me necessary to know how much had been added in the meantime to tell exactly what the man had used.

Mr. Cushing: That is done by the capacity of the chute, or in case of dump cars, or used by the capacity of the dump cars, and both are known very accurately.

Mr. Carothers: Two years ago the road of which I had charge of the maintenance of way department, went to a great deal of trouble and expense to construct coal chutes with arrangements for weighing. This was entirely abandoned last year, at is was found of very little benefit, and at the present time the Baltimore & Ohio road does not weigh any coal on any of its lines going into the locomotives.

Mr. Cushing: I would like to ask Mr. Parkhurst if in his link-belt plants he has had any trouble in handling ashes during the very severe cold weather from the water that is used to wet the ashes down.

Mr. Parkhurst: I would say we have, yes, sir. The plant which is illustrated in the paper and is in use in this city at 26th street is provided with two long ash pits into which the ashes are discharged, and from which they are to be handled by screws which elevate them and direct them to a conveyer that carries them up to bins into which they are stored, and then dropped into cars at will. The men who handle the plant were cautioned to be very careful about the use of the water in cold weather. The plant was finished in December or January and put into use, and the coldest weather we have had was immediately afterwards, and they froze up and tore the machinery pretty badly to pieces. There was considerable expense for repairs on account of that, and we have always had trouble and always would on such a plant. It has been proposed to modify the plant and substitute an entirely different method for handling the ashes from the screws. They work unsatisfactorily in cold weather. There is no trouble in warm weather except the wear of the plant. The wear is very hard in the use of ashes.

Mr. Cushing: Would you anticipate any trouble with the buckets of the Hunt style?

Mr. Parthurst: I think not. In the plant as designed, ashes were proposed to be wet down pretty largely under cover, and where they could be kept from freezing. The ash pits in use now are out in the open air and fully exposed.

Mr. Harahan: I think it all depends very largely on conditions. We made an investigation last year at one of our plants where there is no storage or very little storage, what is called the old-fashioned plant, which is about the best plant. There is no machinery about it. There is nothing to get out of order. Our conclusion in the matter was where there was very little coal to be handled in storage or no coal to be handled in storage that the cheapest plant was what is known as the old-fashioned plant—an incline, with ordinary pockets, so that the coal can be shoveled directly from the cars into the bins, or can be handled by side dump cars into the bins.

Mr. McGuigan: The question of the cost of handling coal is quite a serious one with us, and we are giving it a great deal of consideration. We have 59 different points at which we regularly deliver coal to the engines, and our cost varies all the way from three cents to 60 cents per ton, and we are quite anxious to learn the best practice. We are willing to agree with Mr. Harahan where we have the old-fashioned or chute or pockets of various capacities which suit the capacities of our various trains. With dump cars we can handle coal cheaper than any of our friends. We have handled coal from dump cars at a cost of considerably less than two cents, but our average cost with the same plant, sometimes having to shovel 25 to 40 per cent. of coal, has run in the neighborhood of four cents. A well-known firm in Chicago who furnish appliances for hoisting coal, and other mechanical devices, had their representative in my office a short time ago, and he spent a great deal

of time telling me how very cheaply they could handle coal, and I told him I would be glad to have that information, but in order to test his faith I would like to have him submit bids for handling our coal for 10 years, and he could put in any appliance he saw fit. I haven't yet got his bids.

Mr. Cushing: As the method of procedure in this Association is exceedingly important and always a live subject with us, as a good many of us don't feel we have entirely solved the problem yet, I would like to say that I think this report of the committee is a very excellent one indeed, and very pertinent to the work which we have in hand, viz., the gathering of information to present to the different members of the Association for our information, so that we become posted on what each one is doing. This is a distinct style of report, which I think is one of the important works of this Association. I move the acceptance of the report as a whole. (Carried).

Consolidation Freight Locomotive—Norfolk & Western Railway.

The Norfolk & Western has recently been adding to its heavy equipment a number of consolidation locomotives that have some novel and interesting features. These are known as the Class W, and have been adopted as the standard. The cylinders are 21 in. diam., with a stroke of 30 in., and have piston valves. The design of these cylinders is shown in the engraving, from which it will be seen that not only has the casting been made of exceptional strength but great care has been taken to secure it well to the frames. This is done by means of three 1¼ in. bolts through each of the two rails of the frame, making six in all for each cylinder. In addition to this the two half saddles and cylinders are bolted together in the usual way along the center line.

The steam chest is bushed to permit great accuracy in the location of the parts, and the valve is arranged for an inside admission. The valve itself is 10 in. in diameter, and the bushing filling the steam-chest bore is ½ in. thick. The ports extend entirely around the steam chest, being interrupted in their continuity by six bridges of 1 in. in width and one of 2 in., the latter being set in the bottom of the chest.

It is well known that the use of piston valves involves more or less trouble with the water of condensation that is apt to accumulate both in the steam passages and the cylinders. The valve has no chance to lift nor does the water have an opportunity to get past the valve and thus avoid the blow on the head of the steam chest that would be sure to result if the passages were not properly drained. To meet this difficulty the cylinders have been fitted with two valves shown at A and B. A is a water relief valve for cylinders with piston valves and consists of a seat 6 screwed into the cylinder. The valve 3 is held down by a spring 4, whose tension is regulated by the adjusting screw at the top with a bearing against the top plate of the spring. The spring is held by a cage 5, which is shown in detail at the side and through whose openings any water passing the valve 3 is free to escape.

The other valve is a steam cavity drain cup and is represented at B. The valve is held normally open by the light spring 2, and is closed by the steam pressure, so that the accumulation of water in the passages, when the engine is at rest, is prevented. If desired it can be held open while steam is in the passage, thus permitting the latter to be blown out.

As for the general design of the engine it ranks as a good example of current practice. Attention may be called to the arrangement of the links and valve motion. In order to get as long an eccentric rod as possible and at the same time avoid offsetting them to pass the second driving axle, the link block is carried by a parallel rod carried by a hanger at the front and the lower arm of the rocker, at the back, to which it communicates the motion of the block. This makes a rather long valve rod, but it has been made stiff enough so that no trouble has been experienced from springing.

The engines have shown themselves to be particularly well adapted for the heavy work of the road. Thirty were built on the first order by the Baldwin Locomotive Works, but these were fitted with flat slide valves. They were delivered in 1898 and 1899. In 1900 the road began building the engines at the Roanoke shops and, at the same time, to make some slight modifications in the design. Among these modifications was the substitution of piston for slide valves and the use of a tender of 5,000 gallons capacity.

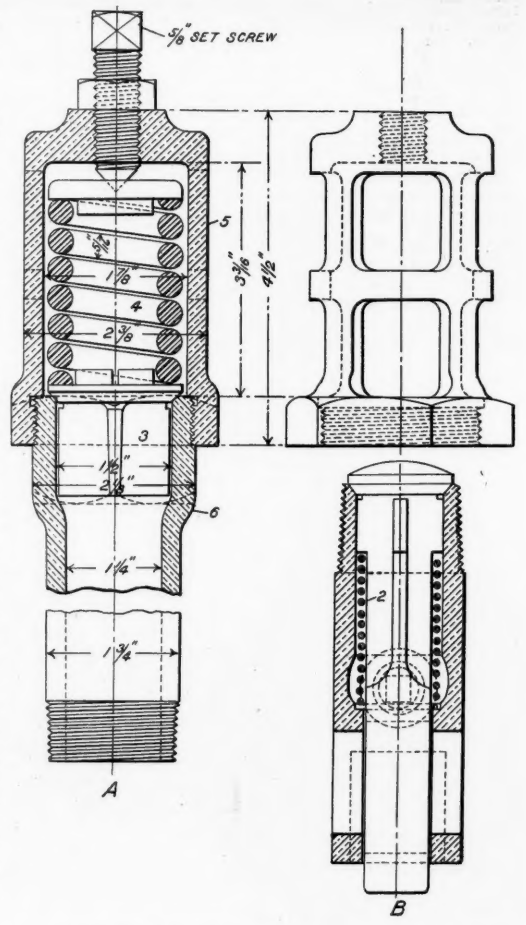
There have now been 45 more engines of this class built, making 75 in all, while orders have recently been placed for 48 more, of which five will be built at the Roanoke shops; 19 by the Baldwin Locomotive Works, and 24 by the Richmond Works of the American Locomotive Co.

Seventy-four of the seventy-five engines now in service have the ordinary fire-box, 41¾ in. wide, resting on the frames. Engine 843 was built with a view to experimenting with a wide fire-box, and the performance has been such as to decide the management to adopt the design as standard, and the above orders are for engines with wide fire-boxes and in accordance with the drawings herewith.

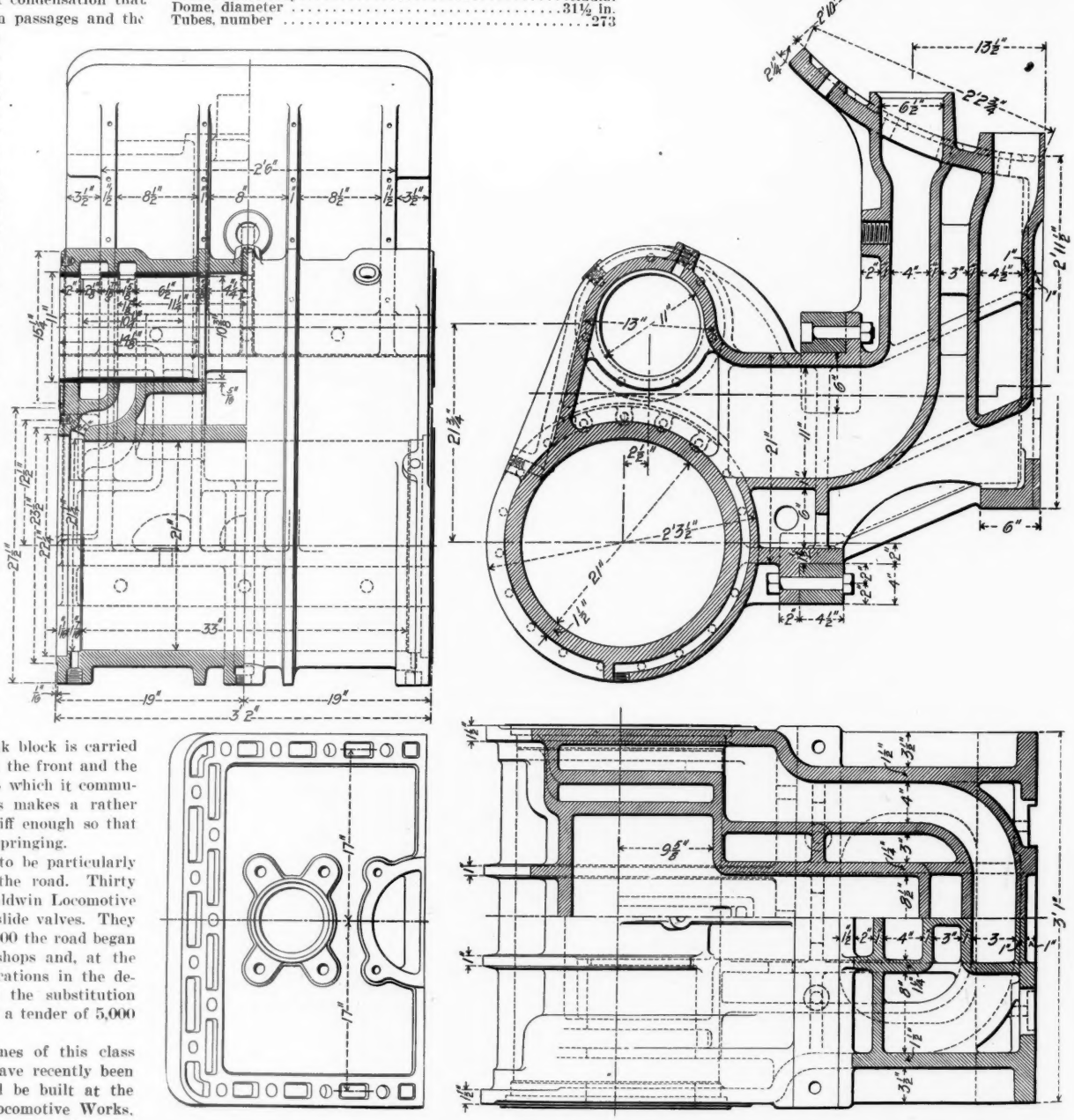
The modifications of the original design of these engines were made in the office of Mr. C. A. Seley, Mechanical Engineer, under the supervision of the Superintendent of Motive Power, Mr. W. H. Lewis, to whose courtesy we are indebted for the description and drawings.

The principal dimensions are as follows:

Gage of road	4 ft. 8½ in.
Kind of fuel	Soft coal
Weight on drivers	150,000 lbs.
Weight on truck wheels	18,000 lbs.
Weight, total	168,000 lbs.
Wheel base, total of engine	23 ft. 11 in.
Wheel base, driving	15 ft. 6 in.
Wheel base, total, engine and tender	50 ft. 4 in.
Length over all, engine and tender	59 ft. 0 in.
Height, center of boiler above rail	8 ft. 6 in.
Height of stack above rail	15 ft. 1 in.
Heating surface, fire-box	156 sq. ft.
Heating surface, tubes	2,318 sq. ft.
Heating surface, total	2,474 sq. ft.
Grate area	47.3 sq. ft.
Drivers, diameter	56 in.
Drivers, material of centers, main	Cast steel
Drivers, material of centers, others	Cast iron
Truck wheels, diameter	30 in.
Journals, driving axles	8½ x 10½ in.
Journals, truck axle	6 x 10 in.
Main crank pin	6½ x 6 31/32 in.
Side rod pins	5 in., 6 in., 7 in., 5 in.
Crosshead pins	4 in.
Cylinders, diameter	21 in.
Piston stroke	30 in.
Main rod, length center to center	10 ft. 4 in.
Steam ports, width	1⅝ in.
Exhaust ports, width	2⅛ in.
Valves, kind	Piston
Valves, admission	Inside
Valves, diameter	10 in.
Valves, travel	6¼ in.
Valves, steam lap	1⅛ in.
Valves, exhaust lap	0 in.
Valves, lead in full gear	0 in.
Boiler, type of	Extended wagon top
Boiler, working pressure	200 lbs.
Boiler, material in barrel	Steel
Boiler, thickness of material in barrel	5/8 in., 11/16 in., ¾ in.
Boiler, diameter at front sheet	64 in.
Seams, kind of horizontal	Double cover butt, sextuple riveted
Seams, circumferential	Double riveted
Thickness of tube sheets	½ in.
Thickness of crown sheets	7/16 in.
Crown sheet stays	Radial
Dome, diameter	31½ in.
Tubes, number	273



A—Water Relief Valve for Cylinders with Piston Valves. B—Cylinder Steam Cavity Drain Cock.



Cylinder Arranged for Piston Valve—Norfolk & Western Consolidation Locomotive.

Tubes, material	Charcoal iron
Tubes, outside diameter	2¼ in.
Tubes, length over sheets	14 ft. 6 in.
Fire-box, length	112½ in.
Fire-box, width	64¼ in.
Fire-box, depth, front	67⅜ in.
Fire-box, depth, back	53¼ in.
Fire-box, material	Carbon steel
Fire-box, thickness sides and crown	⅜ in.
Fire-box, brick arch	None
Fire-box, water space, front, width	4 in.
Fire-box, water space, width, sides	3½ in.
Fire-box, water space, width, back	4 in.
Grates, kind of	Rocking, finger
Smoke-box, diameter	67 in.
Smoke-box, length	65½ in.
Exhaust nozzle	Single
Exhaust nozzle, diameter	5¼ in.
Netting	Plate
Stack	Taper
Stack, least diameter	15 in.
Stack, greatest diameter	17½ in.
Stack, height above smoke-box	45 in.
Tender, trucks	2 4-wheel swivel
Tank capacity, water	5,000 gals.
Tank capacity, coal	10 tons
Tank, material	Steel
Tank sheets, thickness	¼ in. and 3/16 in.
Type of tender under-frame	Steel
Type of tender truck	Arch bar
Truck bolster, tender	Rigid
Tender truck springs	Helical
Tender truck wheels, diameter	33 in.
Tender truck axle, journals	5¼ x 9 in.
Tender truck axle journal centers	6 ft. 4 in.
Tender truck axle, diameter of wheel fit	6⅜ in.
Tender truck axle, diameter of center of axle	5⅜ in.
Length of tender frame over buffers	22 ft. 3⅜ in.
Length of tank	19 ft. 0 in.
Width of tank	9 ft. 0 in.
Height of tank not including collar	5 ft. 0 in.
Height of tank over collar	6 ft. 4 in.
Type of back draw-bar	M. C. B.

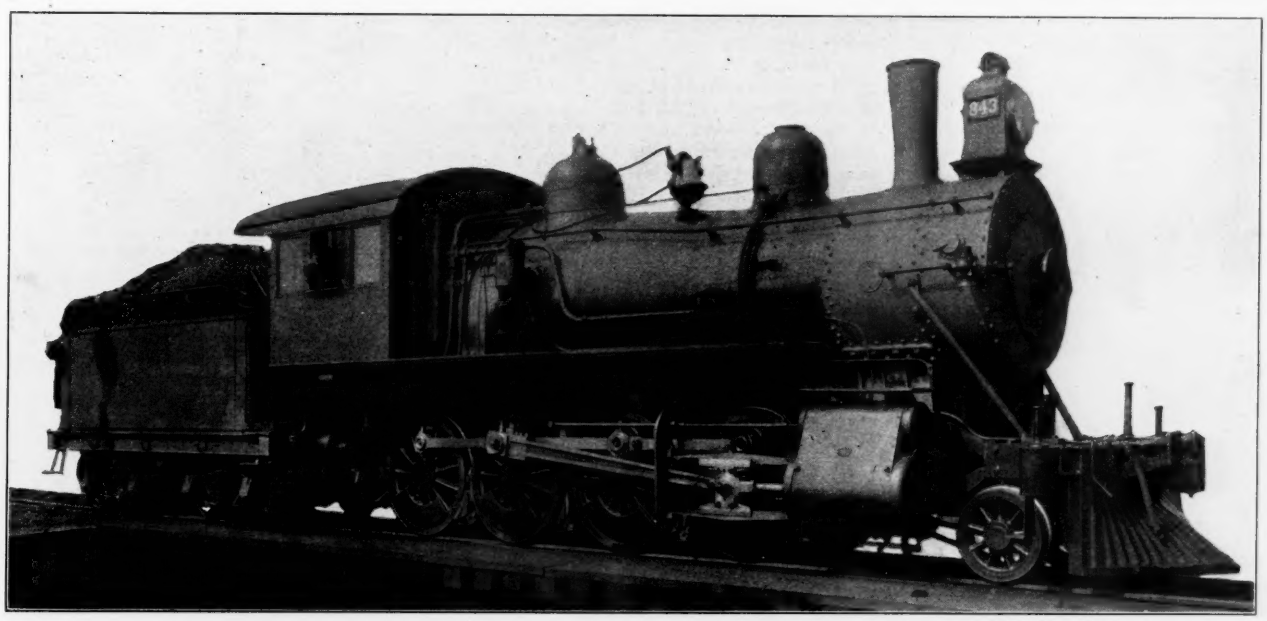
Equipment.

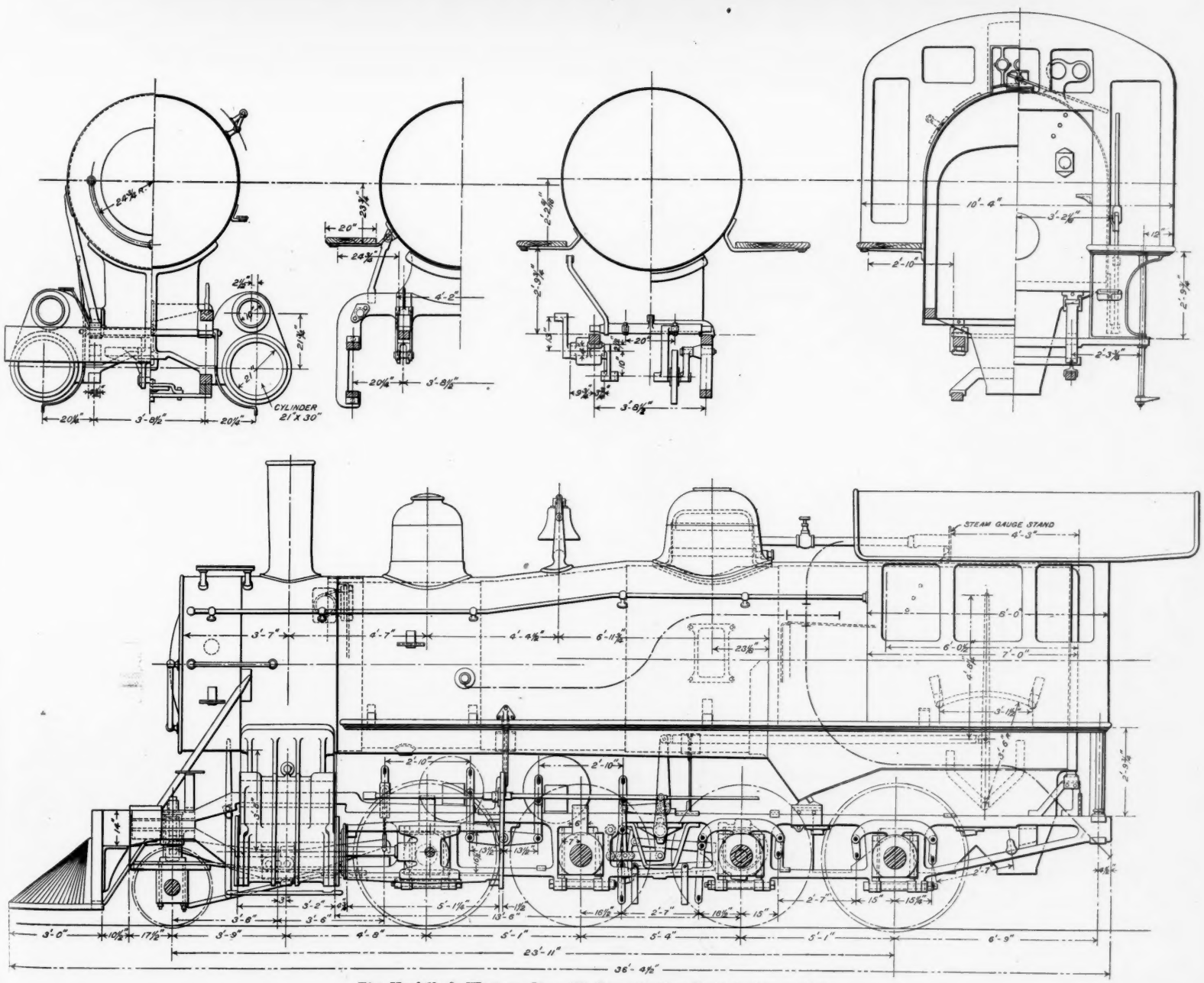
Tires	Latrobe Steel Co.
Sight feed lubricator	Nathan Mfg. Co.
Safety valves	Ashton
Sander	Leach
Injectors	Monitor
Driver brake equipment	American Brake Co.
Tender brake equipment	Westinghouse A. B. Co.
Tender friction draft gear	Westinghouse A. B. Co.
Air pump equipment	Westinghouse A. B. Co.
Steam gages	Ashton
Engine driving and tender springs	A. French Spring Co.
Piston and valve rod packing	United States
Boiler lagging	Keasby & Matteson

These engines have done excellent service, are good steamers; their rated tractive power is 40,160 lbs., and they have exceeded this in indicator tests. They will pull 1,100 tons up a 61-ft. grade with moderate curvature.

New Railroad in Greece.

Under date of April 17, Consul Frank W. Jackson reports from Patras the organization of the Piræus-Larissa Railroad. This company was organized on March 14, 1902, and has been financed by the National Bank of Greece, the Bank of Paris and the Netherlands,





The Norfolk & Western Class W, Consolidation Freight Locomotive.

in France; Hambro & Son, in England, and by the banking house of Bleichröder, in Germany. A road is to be built to open communication with the more or less isolated but rich territory of northern Greece, and to connect with the trans-continental lines of Europe. An agreement with the Greek Government for such a line was reached some two years ago, dependent upon the declaration of peace in the Transvaal, and this is a reorganization of the same. The proposed line will start from the Piraeus and run to Demerly, a point near Larissa and the Turkish frontier, with a number of branches. The route, which would give an indication of the length of the line, is not stated. Monsieur Bouré, former French Ambassador at Athens, is to be President. The chief difficulty in the way of the completion of the road and the one which makes the project an international issue, is the question of its union with the trans-continental line in Turkish territory. It is improbable that the consent of the Ottoman Government will be readily obtained for the junction of the two lines.

Daly's Train-Resistance Computer.

Mr. J. M. Daly, Superintendent of Transportation of the Illinois Central, has devised and patented a mechanical arrangement for quickly computing the resistance of a train of cars without the use of a pencil or paper; and engravings of two forms of his device are shown herewith. Blocks, representing cars, different sizes for different weights, are set in a groove as a train is made up, and when the groove has been filled with the requisite number of blocks, the total resistance (not merely the weight) of the train can be at once read off from the graduated scale at the side of the groove. The movable scales, shown on the octagonal roller (Fig. 2), provide for adjusting a load to locomotives of different capacities. In the arrangement shown in Fig. 1 a board, placed vertically, and movable up or down, takes the place of the roller.

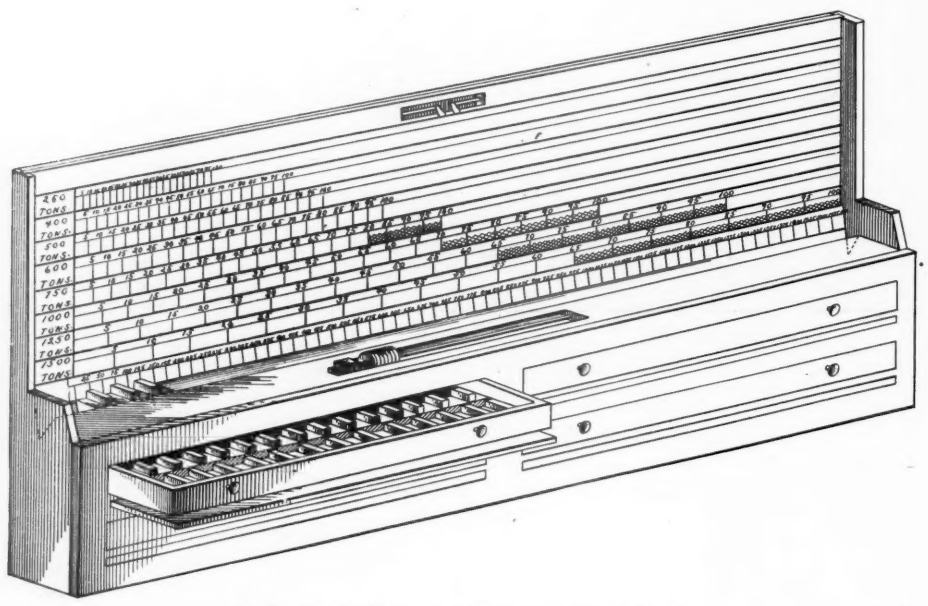


Fig. 1.—Daly's Tonnage Indicator—"Board" Style.

In laying his invention before the railroad world, Mr. Daly presents an elaborate argument to show the need of computing the resistance of trains more accurately than is done by any of the plans now in use; and before describing the mechanical device we will give the main points of Mr. Daly's argument.

As is well known, the resistance of a train varies, not only in proportion to its weight, but also according to the number of cars; the fewer cars the less the resistance per ton. (There is an exception to this, however, where the cars are much too heavy for the rails; 70-ton loads on 56-lb. rails will deflect the rails so much that an engine can haul a greater weight in 50-ton loads.) An engine must be loaded lighter with light cars than with heavy cars, not only because of more wheel friction and wind friction, but also because the longer train is likely to be retarded by more curves at one time. Again, in going over a summit a short train requires less momentum. Present methods of rating are in many cases so crude that engines are not loaded above 70 per cent. of their capacity. Mr. Daly cites several articles in the *Railroad Gazette* and before the New York Railroad Club to show defects in present practice. He sums up his argument in the dictum that while the company must favor the engine, when cars are light and the train is long, the engine should be required to concede something to the company when cars are of very large capacity; for with such a train the engine is favored by the less friction and especially flange or curve friction.

To provide a suitable working basis, Mr. Daly would adopt a standard load; say a car which, with its contents, weighs 40 tons. Call the resistance of this car 40 tons. Rate the engine by testing it with a train of cars each weighing exactly this amount. An engine hauling 25 of these cars would be rated 1,000 tons. If the cars of a train weigh only 20 tons each the locomotive must be loaded with fewer tons because of the additional friction; this is already well recognized. But it is equally true that if the cars weigh 70 tons each the engine can haul a larger aggregate weight. Now, to thus make allowances both ways introduces an additional element into the work of computing, and to simplify this work the mechanical arrangement has been devised.

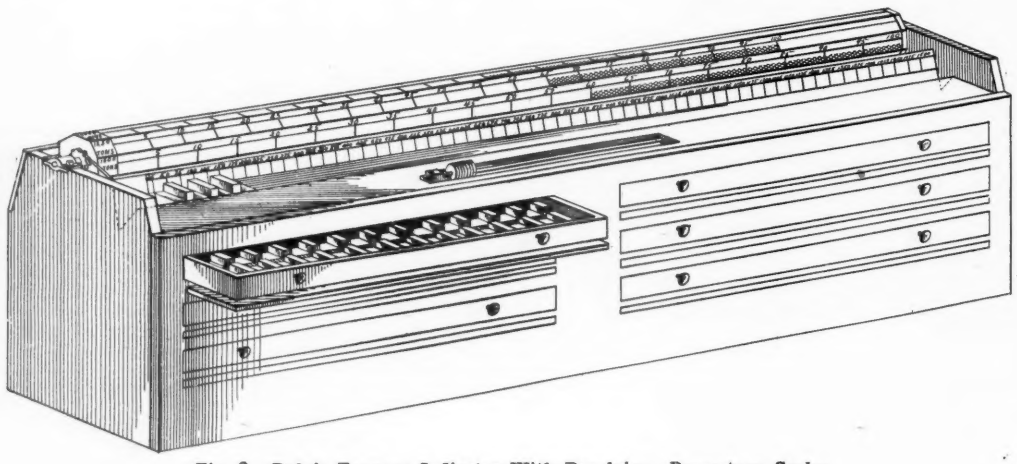


Fig. 2.—Daly's Tonnage Indicator With Revolving Percentage Scales.

This contrivance is designed for use both by yard clerks and by conductors, each conductor to have one in his caboose.

"The correct resistance (expressed, of course, in cartons) of the train, on leaving terminals, is found by the yard officer, and between terminals by the conductor, not by entering in book or on a report the separate weight of each car and its contents, footing the total and then making an arbitrary allowance or deduction for light or heavy cars, but by actually measuring the resistance automatically as each car is added to the train, using neither pencil nor paper, but instead, small blocks or slugs of wood, each representing a car, and made, by scale, of differing thicknesses, according to the corrected tonnage-rating weight of each car and its contents (see example below).

"Each block has the number of tons in weight (not resistance) which it represents marked in black on one end and in red on the other, the object being to use the black numbers for cars in short trains, and, up to a certain limit, in long trains; where journal, wheel and grade resistance only are involved, and the red numbers for cars in long trains, beyond the point from which additional allowance must be made for curves and length-of-train resistance. The resistance, instead of being calculated, is directly measured by means of a divided scale placed horizontally just above a V-shaped groove, in which the resistance blocks, each representing a car, are set from left to right. Above the horizontal scale is a rotary scale, also set horizontally, for showing at a glance the percentage of a made-up train referred to different engine-ratings, from 250 to 3,600 tons. On the percentage scale, at a determined point, where length-of-train resistance becomes a factor, the color changes to red, to indicate that from this point onward the red figures are to be used. When the groove is thus filled to the 1,000-ton mark, an engine with that rating has its full complement of cars, although the sum of those numbers (on the ends of the blocks) may be (in case of an excess of large cars), perhaps, 1,250 tons, or (in case of an excess of small or light loaded cars) only 800 tons; but the draw-bar pull would be the same in either case. A block representing a 70-ton (gross weight) car, measures on the tonnage-scale 60 tons, a 40-ton block exactly 40 tons (it being the standard unit), a 10-ton block 15 tons, etc. The tonnage-rating of a train can thus be very quickly and accurately obtained. The apparatus is of simple construction, and errors of calculation are wholly eliminated."

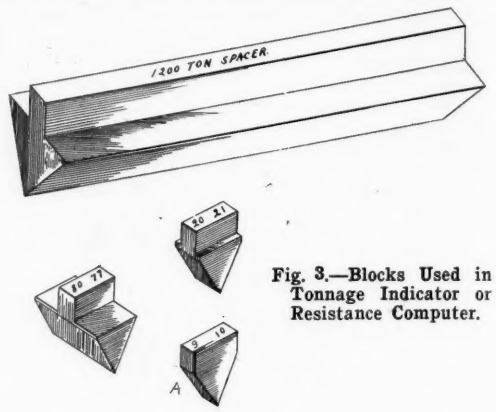


Fig. 3.—Blocks Used in Tonnage Indicator or Resistance Computer.

Mr. Daly regards the computing rules of the Canadian Pacific as the best now in use, but he gives examples showing the complicated nature of the work required by a yardmaster with these. On the Pennsylvania lines an allowance of seven tons is made for friction, but this, he declares, is an arbitrary, lacking in necessary flexibility.

"In bad weather, a conductor may be ordered to reduce his load to 82 or 85 per cent. of his engine's rating. He may sometimes succeed in figuring out the correct amount of the 15 or 18 per cent. reduction; but, by my plan, when he receives such an order, he simply looks at figures 82 or 85 on the proper percentage-scale, and just below it on the tonnage-scale; the point with which they coincide gives the correct number of tons he should have in his train, to equal the reduced percentage required. Under the present methods it is not practical for a conductor to know what percentage of the engine-rating he is hauling between given points. On my device, however, the exact figure is always shown on the percentage scale just above the tonnage or resistance scale; and in less than two minutes the conductor, at the end of a 140-mile trip can enter the necessary data at the head of his report, showing just what service his engine has performed over different sections of the run."

"By means of a similar device, these figures can be quickly verified by the operating department at the division office, or at headquarters by the department charged with looking after the service. This information would be very useful to division-officers, in watching the tonnage moved. At the end of each trip, the conductor could send to the division superintendent a report showing the percentage of rating hauled over ruling grades, and, on the bottom of his time slip, the total tonnage. By this means, the superintendent, without any increased expense, can know at all times what his engines are doing, can quickly take advantage of turn-arounds or doubling, and can effect at once economies in his train-service, without employing a large staff of division tonnage-clerks, or waiting for winter to get from the general office what his summer and fall's service has been."

"The graphic or mechanical computer is of advantage further in the ease with which the load basis can be adjusted to engines not in good condition; and the rapidity with which the work can be done obviates delays to trains; yardmen have more time to devote to useful work."

As before stated, the blocks (see Fig. 3) represent cars, a supply of blocks being kept in the drawers, below the scale, representing a sufficient number of all ordinary sizes of loads. The blocks are cut V shape to fit into the groove as shown. The resistance scale (see figures reading 25, 50, 75, etc.) is marked at every 25-ton interval. The buttons shown on the top of the case in front, strung on a wire, are to count odd tons, being used after the manner of a billiard string. This is in order to save making a great many different lengths of blocks. For instance, with a 21-ton car a 20-ton block is used and 1 ton is counted on the wire; a 19-ton car takes a 20-ton block and you deduct 1 button on the wire. It

will be seen that the whole thing is very simple, there being nothing to get out of order or register incorrectly, and no keys or wires.

The block shown at *A* Fig 3, represents a 10-ton car; the others represent greater weights as shown by the marks. The length of the block, measured along the groove, represents the predetermined resistance, not the weight. For example, the block marked 10 (in black) representing a weight of 10 tons, is long enough to measure on the scale 15 tons, that having been found to be the resistance of such a load. That is to say, the resistance is estimated to be 50 per cent. greater than would be the resistance of 10 tons weight in a 40-ton car.

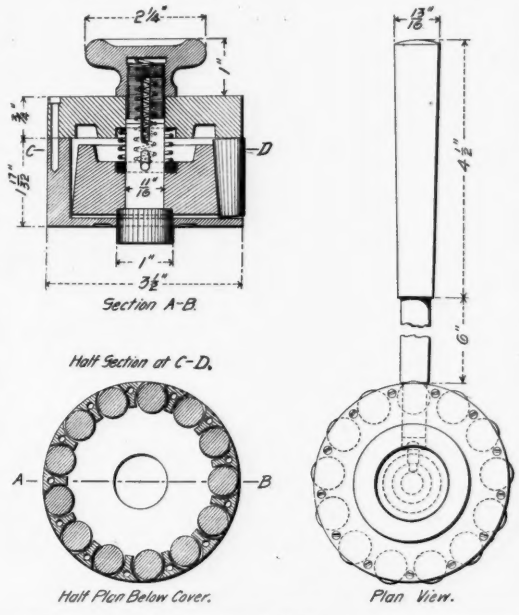
When using this block after the red section of the scale is reached it is to be used for a 9-ton car. The "9" is in red, indicating that in the rear part of a very long train a nine-ton car will create as much resistance as a 10-ton car does in the front of the train.

There is no mental computing. Thus if a number of blocks placed in the groove extend to 450 tons on the tonnage scale, the indication is that the resistance (not the weight) of the train represented by the blocks is 450 tons. Reading now from the scale on the octagon we see that, with this load, an engine rated at 1,500 tons is loaded to 30 per cent. of its capacity; while with one rated at 1,250 tons, one can also, at a glance, read that the engine is loaded to 36 per cent. of its capacity.

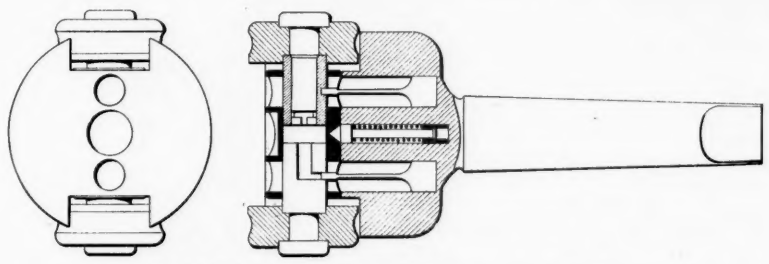
The "Board" indicator (Fig. 1) embodies in a slightly different shape the same principles that have been described in connection with the octagon. The eight rows of percentages above the tonnage scale are on a movable board which can be lowered so as to bring any row close to the figures of the scale at the bottom. The manner of reading is precisely the same in one as in the other. For example, if the line of percentages for an engine of 500 tons' capacity (Fig. 1) be lowered to the bottom, the figures indicating 100 per cent. will be found exactly opposite the "500" on the tonnage scale.

Some New Ideas in Triple Valve Repairs.

The air-brake department of the Atchison, Topeka & Santa Fe shops at Topeka, Kan., is employing some methods in the repairs of triple valves that are an interesting departure from customary practice in such repairs. One of these is a substitute for regrinding worn or cut cylinders; another does away with the hammer in restoring worn or injured piston packing-ring grooves. The ideas originated with Mr. A. R. Davis, General Foreman of the shops, and we present illustrations of two tools which he devised and with which the results mentioned are accomplished.



Roller for Triple Valve Cylinder—Atchison, Topeka & Santa Fe.

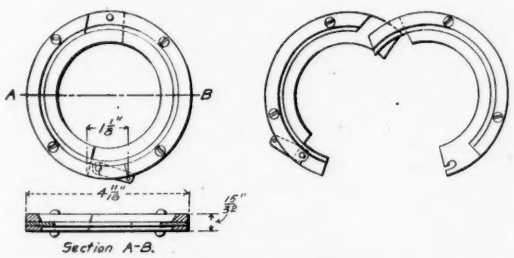


Davis' Triple Valve Piston Roller—A., T. & S. F.

The first of these is a roller, not unlike that used by boilermakers for rolling flues. Its construction is apparent from the drawings. A circular roller-cage of machine steel, having provision for 13 hardened tool-steel tapered rollers, has passing through its center, coincident with its axis, a shaft of tool steel, having a head or collar on its lower end and threaded on the upper end. Within the cage and mounted on the shaft is a center roller, tapered to correspond to the outer rollers, against which it bears.

The cage has a cover, through which the shaft passes and on which there is a knob, screwed on to the end of the shaft. Tightening up on this knob raises the center roller and forces out the small rollers. An expansion of 3/64 in. is provided for.

The result to the cylinder from the use of this tool is a smooth hardened surface and consequent reduction



Davis' Piston Clamp.

of friction. A much nearer perfect fit of the piston is obtained, thus reducing leakage past the piston. This is shown by the leakage test, in which the piston is blocked on center and subjected to an air pressure of 90 lbs. on one side. Formerly all triples that did not show a leakage exceeding 30 lbs. at the expiration of one minute were passed. The new cylinder treatment has reduced this leakage by about one-half.

The object for which the other tool is designed is also accomplished by rolling. This device consists of three parts; a roller, a piston clamp and a circular base. The latter is not shown. The tool was designed for use in a drill press, as its form would indicate. Running through the chuck transversely, and near the bottom is a hole, slightly elliptical at each end with the long diameter vertical. In this opening is fitted a sleeve, which being circular, is free to rock slightly in a vertical direction; it is held in place by the small spindle seen in the center of the chuck. Within this sleeve are two smaller sleeves held in position by the two retainers, seen on either side of the center of the chuck, and which fit into suitable grooves on the outer surface of the sleeves. The pins, or shafts, carrying the two grooved, hardened tool-steel rollers slip into these small inner sleeves and are locked by inwardly-projecting pins engaging in the grooves at the inner ends.

The construction of the piston clamp does not require explanation. The central portion, which projects inwardly as a lip, fits into the packing ring groove. It is of course the exact thickness of a new packing ring, 3/32 in. The ends of the clamp are locked together by throwing the smaller lever, seen on the left in the "open" view, around to the right. After locking the clamp on the piston, the two are placed on the hollow circular base with the stem of the piston projecting downward. The chuck is then brought into position and the rolling done at whatever pressure is necessary. The work the tool does is very satisfactory. Pistons that formerly were thrown away because of their badly worn or damaged condition, can now be restored to service.

By the use of these two tools the repairs are made in about one-half the time, or, in other words, they double the capacity of the department for triple valve repairs of the kind mentioned. The cylinder roller costs about $18 to make in a shop tool room. As the rolling operation requires only about three minutes the tool pays for itself in a very short time. Mr. Davis has been granted a patent on the cylinder roller and has applied for a patent on the piston roller.

There is a method in use in some other shops which does the work of this piston roller by air pressure. Whether or not the results are as satisfactory we are not able to say.

Mr. Davis is also engaged in bushing with brass the check-valve casings of the old triples that have cast-iron valve seats. All new triples have this brass bushing. Its insertion was found to be necessary because of the trouble that was experienced from water-cutting of the iron valve seat. Many of the roads are throwing away the old casings and substituting new ones for them. It costs the Santa Fe about 10 cts. to put in one of these bushings. To ream out a casing preparatory to bushing, a Z angle-plate is bolted to the table of a drill press. The upper leg of this plate has a hardened steel bushing fitted in it, which acts as a guide for the ream. Two pins hold the casing central and a wedge is driven beneath to hold it tight against the angle-plate. A ream of special form is used to give a square seat for the bushing and also to give the required depth.

Illinois Central's Waterloo Shops Closed.

The shops of the Illinois Central at Waterloo, Iowa, were closed by the company at noon on April 15 until further notice. These shops are quite large, the number of men employed being over 500. The trouble that caused the railroad company to take this action had its origin in a demand made some time since by those employees classed as unskilled labor for an advance in wages amounting to from 20 to 25 per cent. Accompanying this demand was a notice that if it was not granted by a given date a strike would be declared. A conference of the proper officials, called to take action on the matter, was delayed through press of other business, until the limit had all but expired. At this conference it was agreed to grant an increase to these men, the advance to be such as would bring the scale of wages into agreement with the standard paid elsewhere. Notice that favorable action had been taken was telegraphed immediately, but the report sent by mail failed to arrive before the expiration of the limit and the strike was declared. Accordingly a notice was posted by the railroad company to the effect that the men would be given until 7 a.m. April 15 to return to work, and those not returning would no longer be considered employees. The members of the International Association of Machinists, International Brotherhood of Blacksmiths, and of the Brotherhood of Boilermakers and Iron Shipbuilders of America employed in the shops and representing the skilled labor immediately decided on a sympathetic strike, despite the fact that there existed an agreement requiring that 30 days notice of such action should be given. Their decision therefore appears to have been in violation of this agreement. As a result of this latter action a second notice was posted by the railroad company closing the shops. This notice states that all employees remaining loyal to the company will be provided with employment elsewhere.

A New High Speed Record.

Officers of the Chicago, Burlington & Quincy have confirmed the record of a remarkable run made on March 24 by train No. 6, eastbound, on the Burlington & Missouri River between Eckley and Wray, Colo., which establishes a new world's record for a run of 14 miles and over. The distance between these two towns is 14.8 miles, and it was covered in exactly nine minutes, or at the rate of 98.66 miles an hour.

Conductor Burns, in charge of the train, says in his report that the train left Denver 10 minutes late, having to wait for a California sleeping car. A heavy wind prevailed from Denver to Akron, a distance of 112 miles, making the train 30 minutes late, leaving Akron (7:17 p.m). When behind time it is customary for trains to run from Akron to Wray, 54 miles, at a speed of 70 to 75 miles an hour. Eckley, 39 miles east of Akron, was passed at 75 miles an hour, and, as above stated, the time from Eckley to Wray was nine minutes. The time was taken by five separate watches, including the conductor's, in the hands of as many men in the observation car, and all watches agreed as to time.

The train consisted of a mail car, baggage car, two reclining chair cars, three sleeping cars, a dining car and a private car, nine in all. We have not been able to learn its weight. There is a down grade from Eckley to Wray, the maximum being 32 ft. to the mile. There is one curve of 1.7 deg. The engine was B. & M. R. No. 41. It is a 10-wheel engine, 19 x 26 in. cylinders, class K-4, with 72 in. drivers. The weight of the engine is 156,000 lbs., and of engine and tender 254,500 lbs. The heating surface measures 2,430 sq. ft.; and grate area 30 sq. ft. These engines were designed for heavy service rather than for extreme speed, which makes this performance all the more remarkable.

Erecting Bridges in the Colonies.

A well informed writer contributes to *The Engineer* (London), of Jan. 31, a discussion of some of the facts observed in erecting English bridges in the colonies. He calls the attention of British engineers and bridge builders to the obvious fact that other people know how to build bridges for the colonial market, and appear to build pretty good ones; and he points out that the Americans have no more a monopoly of pin-connected structures than the British have of riveted bridges. He suggests to his readers that American engineers have had some experience and that they are "at least equal to us in powers of conception and engineering skill."

In designing bridges for the colonies an important requirement is ease of erection and among the factors to be taken into account is the climate. That is, much of this work must be done in climates where only inferior races of men live and work. This writer had an opportunity to inspect two colonial bridges of 100-ft. spans just erected in a country lying near the equator. Native labor had been used. He quotes the notes made on the spot. Roughly speaking, about 1,000 rivets had be put in by hand, in each girder, and about 24 per cent. of these were thoroughly bad. They had badly formed heads, cracked, burnt, heads on one side, or partial heads. The field riveting that might have been called good was not first

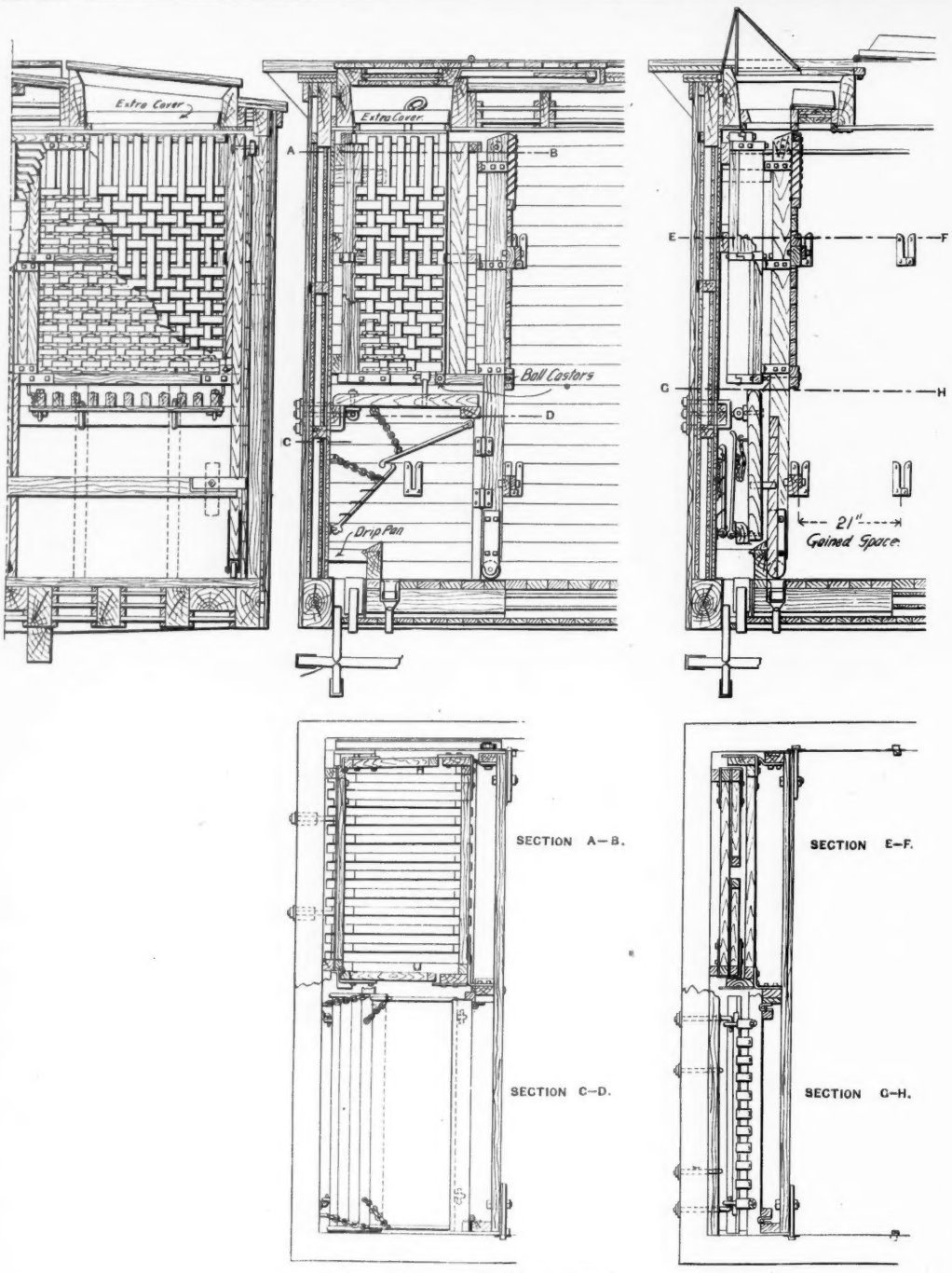


Fig. 1.—Jenings Collapsible Ice Tanks.

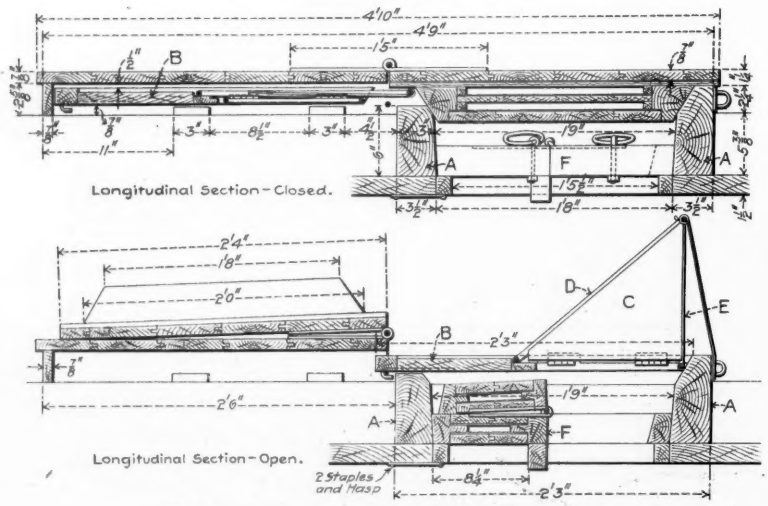


Fig. 2.—Jenings Permanent Sliding Ventilator.

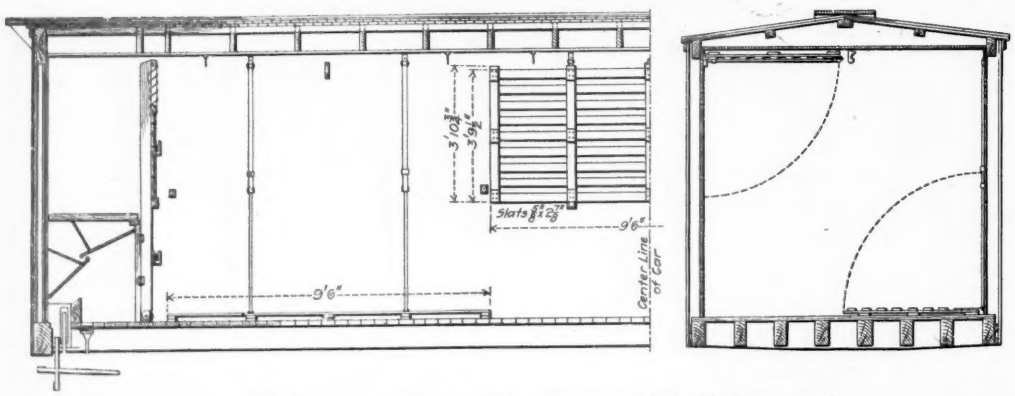


Fig. 3.—Arrangement of Jenings Permanent Floor Racks.

rate work, and the girders were only fairly straight. In instances where the T iron diagonals come inside the top boom there was no attempt to make a head on the rivets. They were left with the shank slightly turned over or clinched, as one clinches nails in timber. "We do not hesitate to assert that the joints in these girders are not as strong by 50 per cent. as their designer intended them to be." There was no trace of camber to be seen. The line of the top boom of all four girders was distinctly wavy.

The writer thinks it very galling that an abnormally high standard should be demanded for home work and a standard so low be allowed to pass elsewhere. "To go to such length as filing and chipping ends of stiffeners, and filing and fitting ends of diagonals, and then to spoil everything by such after treatment is only play at work."

The obvious conclusion from observations is that the designs should be remodeled so far as to demand less of skilled labor in erection.

The Jenings Collapsible Ice Tank.

Mr. Geo. W. Jenings has recently perfected some new details for refrigerating cars, chief among which is the collapsible ice tank shown in Fig. 1. The principal feature of these ice tanks is the increased loading capacity. When carrying freight requiring no ice the tanks can be folded, and 221 cu. ft. gained. There are two of these tanks placed in each end of a car, and they are adapted to any car and can be applied to old cars at little expense.

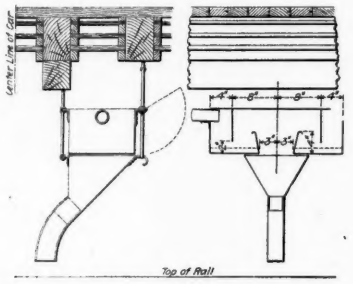


Fig. 4.—Jenings Trap and Floor Drain.

Fig. 2 shows the Jenings improved sliding ventilator. This ventilator can be used whether the tanks are open or not, thus giving the use of the additional space for all classes of fruit, produce, etc., not requiring ice. The ventilator covers the ice opening in the car in the usual manner, and when not in use is slid back into and protected by a pocket provided to receive it, as shown in the illustration.

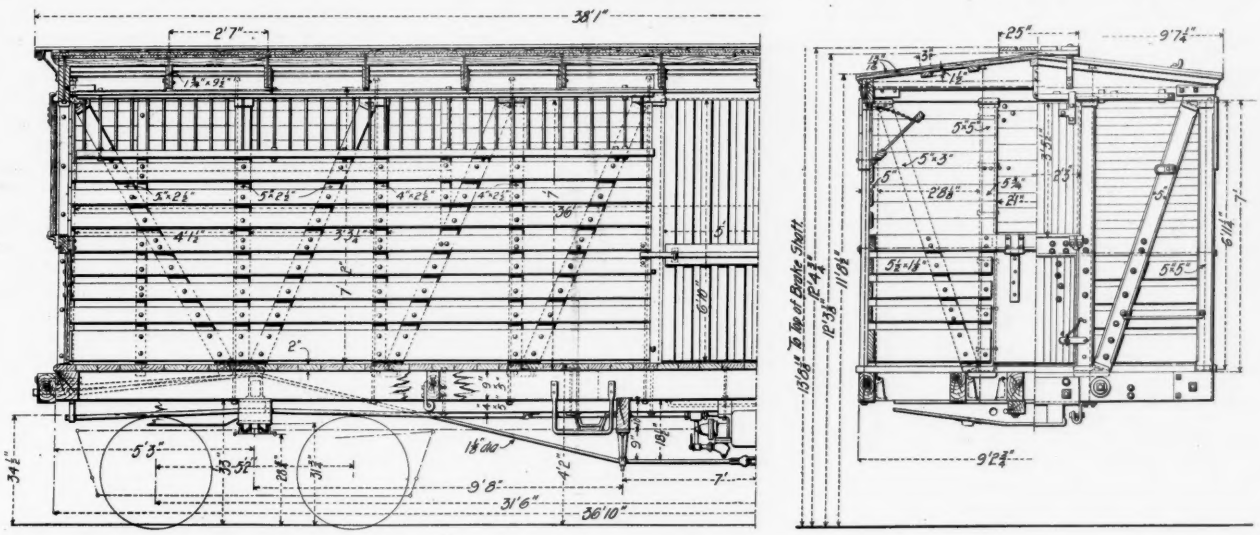
The Jenings permanent floor racks are shown in Fig. 3. These racks, of which there are six (three on each side of car), are intended to take the place of the movable floor-racks, which are ordinarily used and which seldom make more than one trip, usually being thrown out of car when it is unloaded and then broken up for kindling, or any other purpose. The racks are made of soft elm slats, nailed to soft elm battens in the usual way, three blocks being nailed to the under side of each batten to give desired height, and all secured permanently to the car, as shown in the illustration, by telescoping iron channels which allow of their being carried next to the ceiling when not in use, while at the same time they can be very readily and easily placed on the car floor when so required, the operation being very similar to that of the ordinary grain door.

Fig. 4 shows the trap and floor drain. These drip water traps and floor drains are designed to overcome the injurious effects of salt water discharging on the trucks and rails, and at the same time to provide a simple and efficient trap that can be readily cleaned and kept open en route, without the necessity of opening the car doors. This is accomplished by abolishing the four inside traps usually used and substituting one large outside trap, which is located underneath the car. The water is carried to it by two inch galvanized iron pipes leading from the drip pans, and the overflow is received by a funnel-shaped sink immediately beneath, which is provided with a rubber hose outlet, finally discharging the water directly between the tracks and so near the ground that there is no splash resulting whatever. The trap is provided with a drop-door which, when raised, will readily permit the entrance of the hand and arm, so that there is no difficulty in removing any accumulation of dirt, or other obstruction, and in cold weather, salt (or any other preventive of freezing), can readily be placed in it at each icing station, thus effectually preventing it from freezing up.

The pipes are provided on the ends with caps. These caps can be removed so that a straight rod can be run through both the horizontal and perpendicular pipes from end to end, rendering it a very simple matter to remove any obstruction. The caps are secured to the car by safety chains. In case the outlet should by any possibility become clogged, an emergency trap is provided in the drip-pan, which is similar to those now used, excepting that it does not come into use until the water raises in the drip-pan to a level with the car-floor. To do away with the damage frequently caused by water accumulating on the car floor, automatic floor drains are provided, the seal being formed by a small rubber valve, which is lifted by a cork float, as soon as any water enters the pan, thus immediately allowing it to escape, when the valve again closes by gravity, insuring a perfect seal at all times.

60,000-lb. Stock Car of the Illinois Central.

The Illinois Central has designed and is building at its Burnside shops, Chicago, some 60,000 lb. capacity stock cars, drawings of which we present herewith. They are 36 ft. 10 in. over end sills, and 9 ft. 7¼ in. wide outside, the inside dimensions being 36 ft. long by 8 ft. 6¼ in. wide, and a clear height of 7 ft. 2 in.



60,000 lbs. Capacity Stock Car of the Illinois Central.

The principal longitudinal sills, six in number, are all 5 x 9 in.; there are two additional short sills, 2 x 9 in. opposite the door openings, between the side and intermediate sills, and carried by the needle beams. The end sills are 7 x 9 in. The 4 x 10-in. needle beams are gained into the longitudinal sills ½ in.; with a 9-in. queen-post this gives a depth of truss of 18½ in. Six 1⅛-in. truss rods are used.

The side framing has 4 x 2½-in. posts and 5 x 2½-in. diagonal braces, set in one-piece malleable iron pockets. The end posts and braces are 5 x 3 in., the braces being placed the reverse of usual practice, the object being to furnish additional support to the corners of the car. The corner posts are 5 x 5 in.

A double board roof is used, secured to 1½ x 5-in. purlins, resting on carlines 9½ in. at the center, and tapered to 3½ in. next to the tenons. These cars are provided with hayracks, running the length of either side, except where the door openings occur. The side doors have openings 5 ft. x 6 ft. 10 in.; there are also double end doors having an opening 2 ft. 3 in. wide.

Bettendorf I-beam and Simplex bolsters are used, a portion of the lot of 450 cars being equipped with each kind. The bodies are carried on 30-ton Kindl trucks, having standard 4¼ x 8-in. journals. The brake-beams are pressed steel and are outside hung. Gould malleable draft arms are employed, and malleable castings are used throughout in the construction.

An Acetylene Gas Exhibition Car.

One of the latest competitors in railroad lighting by acetylene gas is the Railroad Car Lighting Co., of Chicago. In order to avoid the annoyances and difficulties usually experienced in placing trial plants on cars for various railroads this company decided upon the novel plan of equipping an exhibition car to send around over the country as a practical illustration in as complete a form as possible of the working of its system. The car is a 46-ft. passenger coach remodeled. The seats were allowed to remain in one-half of the car and in the other half two compartments have been built, both of which may be used for sleeping.

Two generators are placed on the car, one being rated a 26-hour, and the other, much larger, a 75-hour. This rating is based on the lamp equipment of the car, comprising ten lamps, each having two burners using ½ cu. ft. of gas apiece an hour. These lamps are a special design and present a very pleasing appearance. In addition to the lamp equipment there is an acetylene gas stove having four burners and an oven, made by the Dangler Stove Co., Cleveland, Ohio. The idea with these stoves is to place them on buffet sleeping cars having the acetylene lights, where it is thought they will prove most convenient and satisfactory.

The generators in exterior appearance are long cylinders, running from the floor to the roof of the car and are respectively 15 and 18 in. in diameter. As already mentioned, they belong to that class in which the carbide is fed to the water, the supply being automatically regulated by the gas consumption. All charging with carbide and water is done from the roof of the car, thereby obviating any possibility of objectionable odors escaping in the car. The company is not fully formed as yet. Mr. E. P. Caldwell is general manager and Mr. W. S. Freeman is secretary and treasurer.

Consolidation Switching Locomotives for the Chicago Union Transfer Railway.

The Cooke Works of the American Locomotive Company has recently completed four large consolidation switching locomotives for the Chicago Union Transfer Railway, whose new clearing yards were described in the *Railroad Gazette* for March 14. We show an engraving from a photograph of one of these engines from which it will be seen that they have a wide fire-box and piston valves.

Consolidation Switching Locomotive—Chicago Union Transfer Railway.

The cylinders are 21 x 26 in. and the drivers are 51 in. in diameter. The weight on drivers is 165,000 lbs. and the total weight of the engine is 185,000 lbs. The boiler is of the straight-top, radial-stayed type, designed for a working steam pressure of 200 lbs. The barrel is of 11/16 in. steel and is 71⅞ in. in diameter. The fire-box is 96 in. long by 72 in. wide, 70 11/16 in. deep in front and 60 11/16 in. deep at the back; no brick arch is used. There are 150.2 sq. ft. of heating surface in the fire-box, 2681.3 in the tubes, or a total heating surface of 2831.5; the grate area is 48 sq. ft.

The tender weighs 110,000 lbs. and has a capacity for eight tons of coal and 5,000 gals. of water. The underframe is of steel channels, and the whole is carried on Fox pressed steel trucks.

New York driver and tender brake equipment are used, and other special equipment includes Nathan sight-feed lubricators, Gollmar bell ringers, Tower couplers, Leach sanders, Monitor injectors, Ashcroft steam gages, Dressel headlights, Sterlingworth brake-beams, and Jerome metallic packing for piston and valve rods. The principal dimensions not already given are:

Description.	
Wheel base, total, of engine	23 ft. 0 in.
Wheel base, driving	15 ft. 0 in.
Wheel base, total (engine and tender)	51 ft. 9⅞ in.
Length over all, engine	34 ft. 3⅜ in.
Length over all, total, engine and tender	57 ft. 10⅜ in.
Height, center of boiler above rails	9 ft. 1½ in.
Height of stack above rails	14 ft. 7 in.
Drivers, material of centers	Cast steel
Truck wheels, diameter	30 in.
Journals, driving axle, size	9 x 12 in.
Journals, truck axle, size	6 x 10 in.
Main crank pin, diameter	5¼ in.
Piston rod, diameter	4 in.
Main rod, length center to center	9 ft. 7⅞ in.
Steam ports, length, circular	25.66 in.
Steam ports, width	1 13/16 in.
Exhaust ports, length, circular	25.66 in.
Valves, kind of	Piston
Valves, greatest travel	6 in.
Valves, steam lap	⅞ in.
Valves, exhaust lap or clearance	Line and line
Valves, lead in full gear	1/32 in.
Valves, lead constant or variable	Variable
Boiler.	
Seams, kind of horizontal	Butt joints, sextuple riveted
Seams, kind of circumferential	Lap joints, double riveted
Thickness of tube sheets	Front, ⅝ in.; back, ⅝ in.
Thickness of crown sheet	11/16 in.
Crown sheet stayed with	1 3/16-in. radial stays
Dome, diameter inside	30 in.
Fire-box, material	Steel
Fire-box, thickness of sheets	⅜ in.
Fire-box, water space, width	Front, 4 in.; sides, 3½ in.; back, 3½ in.
Grate, kind of	Rocking finger bar, dump at back
Tubes, number	368
Tubes, material	Charcoal iron
Tubes, outside diameter	2 in.
Tubes, length over sheets	13 ft. 11 in.
Smoke-box, diameter outside	75 in.
Smoke-box, length	76 in.
Exhaust nozzle	Single
Exhaust nozzle, diameter	4⅝ in.
Exhaust nozzle, distance of tip below center of boiler	4¾ in.
Netting	Wire
Netting, size of mesh	2½ x 2½ in.
Stack	Straight
Stack, diameter inside	15⅝ in.
Stack, height above smoke-box	28¼ in.
Tender.	
Type	Steel frame, swivel trucks
Tank, material	Steel
Tank, thickness of sheets	5/16 and ¼ in.
Type of under-frame	Steel channels
Type of truck spring	Double elliptic
Diameter of truck wheels	33 in.
Diameter and length of journals	5 x 9 in.
Distance between centers of journals	76 in.
Diameter of wheel fit on axle	6⅝ in.
Diameter of center of axle	5⅝ in.
Length of tender frame over bumpers	22 ft. 1½ in.
Length of tank, inside	19 ft. 11¼ in.
Width of tank, inside	9 ft. 6¾ in.
Height of tank, not including collar	5 ft. 1¾ in.
Height of tank over collar	6 ft. 7⅜ in.

A St. Petersburg paper says that the Minister of Transportation contemplates putting on two through trains daily between Moscow and Irkutsk when the Chinese Eastern Railroad shall have been fully completed, in 1905. This seems to give sufficiently early notice.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The Right to Route Your Freight.

The Interstate Commerce Commission announces that it has decided that a railroad has *not* the right to route freight over connecting lines as it pleases, regardless of the wishes of the shipper. As this is an interesting legal question, and one which the Supreme Court of Tennessee has decided the other way, many people will be interested to see the Commission's full decision, when it comes out.

The present decision is by Commissioner Clements, and it is in the case of the Consolidated Forwarding Company and the Southern California Fruit Exchange against the Southern Pacific and Santa Fe roads. The question is whether the carriers can lawfully reserve to themselves the routing of shipments and deny the shipper his choice of established routes. The Southern Pacific and the Santa Fe are initial carriers in Southern California for shipments of oranges and lemons and they form routes with numerous connecting carriers to Eastern cities. These carriers claimed that joint through routes and rates are made by agreement between connecting lines and such routes and rates are to be regarded as open to the public only upon such conditions as may be specified under the agreement.

The Commission says: Joint through routes and rates are ordinarily the subject of agreement between carriers, and when established, and until finally abrogated or changed, they are required by the statute to be kept open to public use. In respect of both joint and individual routes the provision in the law is uniform that established rates shall not be increased except after ten days' notice; or reduced except after three days' notice. If the initial carriers may control the routing and deny the shipper any choice or control in a selection as between the different routes, then a route or tariff may be available to one shipper, but not to another, and open one minute to a shipper, but closed the next; this to be determined by the carriers' agents according as they may desire to distribute the shipper's business among one another from time to time or for any reason whatever. The Commission finds nothing in the statute authorizing routes or tariffs of any kind available to shippers only at the option and in the discretion of the carriers, and concludes that the practice of the defendant companies in thus denying to shippers the use of their transportation facilities by the established routes is unlawful. (The questions whether the carriers pool the citrus fruit traffic and whether the transportation rate, the minimum carload weight and the refrigerating charges are unjust, are held open for further investigation.)

The Tennessee decision, which also touches on the question of pooling, is quite fully reported in the *Railroad Gazette* of June 30, 1899, page 474. In that case the court held, we believe, that the shipper did not come into court with clean hands; and it also held that a judicial proceeding of some other kind than that chosen by the complainant would have been a more appropriate method for him to adopt to get his rights; but the decision, nevertheless, was entirely inconsistent with the rule of the Interstate Commerce law, never yet challenged in court (except, perhaps, indirectly, in this Tennessee case), that a through rate once established is good for all shippers until it is changed, after due and sufficient notice. It is to be hoped that a way will be found to have the present case, or one of the same kind, taken to the Supreme Court of the United States.

Concerning Rails.

Those who care to follow the course of development of the rail art will be interested to read (our issue of April 18, p. 286) the discussion of the report on rails of the Maintenance of Way Committee. It should be read with care, for a number of good points were brought forward. We were obliged to condense it a good deal, but saved all the essentials. Incidentally, we indicated various important changes which the Committee made in the report after it was put in type, and before it was presented to the Association officially.

In introducing the report Mr. Trimble spoke of the paragraph suggesting service tests. It is suggested that rails of various sorts should be tried together on curves where the wear is fast. Mr. Trimble mentioned the Pennsylvania's tests in this way of nickel steel, open-hearth steel, and Bessemer of the ordinary composition. He did not, however, give us particulars of the results other than to say that the nickel steel (three per cent. nickel) showed little wear as compared with the regular product. Nevertheless, it is a fact, we believe, that the Pennsylvania will not buy any more nickel steel rails—at present, at any rate.

Mr. Torry raised an important point in the matter of the allowable variation of height, and in his contention he was supported by Mr. Cushing. The result was that the recommendation of the Committee to permit $\frac{1}{32}$ in. over and $\frac{1}{64}$ in. under the section was changed to $\frac{1}{64}$ in. either way.

Concerning shrinkage the Committee recommended in its report as we printed it March 21, that for 33-ft. rail (the standard length of the Association) shrinkage should not exceed six inches for an 85-lb. rail and 6⅛ for a 100-lb. rail. Mr. Trimble explained that it is impossible to specify the same shrinkage for different processes, therefore, the Committe left the number of inches blank in the report as adopted. The Pennsylvania Railroad prepares its specification for 30-ft. rails and in the specifications adopted last October it specifies 5½ in. for shrinkage for 85-lb. rails and 5⅝ for 100-lbs., with no artificial cooling between the finishing pass and the hot saws. We should guess that nobody would undertake to say now just what difference must be made as between, for instance, the Kennedy-Morrison process and the Maryland Steel Company's process, or if any difference should be made in the shrinkage allowed. Doubtless the Committee was wise in leaving out the specific figures.

Concerning other points brought up in the discussion we do not care now to say anything further, but we have called attention to the discussion mainly because it treats of a variety of points and helps to keep alive interest in a subject which is considerably neglected by railroad engineers, perhaps because most of them think it is too complicated for them to tackle.

Annual Reports.

Lake Shore & Michigan Southern.—The report of the Lake Shore & Michigan Southern Railway Company for the year ending Dec. 31, 1901 (32nd annual report) is just received. It covers 1,411 miles of road operated, on which the second track is 522 miles and the side track 838. The side tracks are 59 per cent. as long as the main line, which must be pretty close to the maximum for a road of this length.

We notice the familiar statement that the capital stock has remained unchanged since 1871, standing at $50,000,000, of which all but a trifle over half a million is common stock. For the funded debt, however, a new formula must be adopted, since the consolidation and refunding process began. As a result of exchanges since June 1, 1897, old bonds to the amount of $36,880,000 have been retired and the funded debt has been increased $6,239,000; but the annual interest saving is $1,072,435.

The result of operations are given in detail in the table below, but a few of the most important facts may be summarized. The gross earnings are 29¼ million, and the net earnings a little over nine million. Adding income from other sources there was a gross income of 10⅛ million. Pretty nearly three million of this was absorbed in interest on funded debt and rentals. Dividends at the rate of 7 per cent. were paid on the common stock, amounting to $3,462,655, leaving a surplus for the 12 months of $3,692,470.

Freight earnings increased a little over seven per cent., although the ton-miles of revenue freight increased 10.65 per cent. The average rate per ton per mile fell from 0.505 cent to 0.489 cent. With the increase in revenue ton-miles, the increase of freight train-miles was only 5.16 per cent., or less than half as much as the increase in ton-miles. The increase in loaded car-miles was 7.29 per cent. The average train load of revenue freight reached the very fine figure of 530.5 tons, an increase of 16.67 per cent., and it is hard to conjecture where this progress is going to stop.

The passenger earnings increased 26.43 per cent.; but the miles increased 42.15. That is, the average passenger rate fell from 2.03 cents to 1.81 cents. The change in passenger miles as well as in rate was largely due to the Pan-American Exposition business, which is also indicated in the increase of average journey from 53 miles to 63 miles, and the increase of train load from 53 to 68.

The increase in operating expenses was 16.8 per cent., but there was only one item of very great increase, namely, new equipment. In the year under review the sum of $3,589,000 was spent for new equipment and charged to operating expenses. The year before this the expenditure was $2,268,000, an increase of $1,321,000. The greatest expenditure was for freight cars, and the next for locomotives. For other rolling stock the amount spent was less than in the preceding year. The increase in locomotive repairs was important, namely, $312,000 to an aggregate of $880,000. Repairs to freight cars increased $100,000 to a total of $764,000.

It is very obvious to one who studies recent reports of this splendid property, that it is rapidly and systematically getting into condition to make the most efficient use of the very perfect road and track which Mr. Newell left behind him.

The summary table of results of operations follows:

Earnings and Expenses.

Earnings:	1901.	1900.	Increase.
From freight	$19,616,097	$18,317,427	$1,298,670
From passengers	6,805,208	5,382,787	1,422,421
From mails and express	2,382,489	2,307,929	74,560
From all other sources	468,881	458,371	10,510
Total	$29,272,675	$26,466,514	$2,806,161
Expenses:			
Maintenance of way and structures	$3,392,964	$3,089,832	$303,133
Maintenance of equipment	2,314,619	1,788,120	526,499
Conducting transportation	9,803,052	9,090,305	712,747
General expenses	402,596	362,579	40,017
Taxes	707,918	709,134	*1,216
Total	$16,621,150	$15,039,970	$1,581,179
New equipment	3,589,080	2,267,825	1,321,255
Grand total expenses	$20,210,229	$17,307,795	$2,902,434
Net earn. from operation	9,062,446	9,158,719	*96,273
Income from investments	1,329,290	749,621	579,669
Gross income	$10,391,735	$9,908,340	$483,396
Fixed charges	3,236,611	3,249,909	*13,298
Net income	$7,155,125	$6,658,430	$496,694

*Decrease.

American and British Locomotives in Egypt.

Within the last few days a number of cable despatches have come across the water giving the results of certain comparative runs by American locomotives and British locomotives, both freight and passenger, made for the information of the Government of Egypt. We have now before us the official papers in the matter, being the correspondence sent to Parliament in March. It seems that almost a year ago, Sir Alfred Hickman asked the British Government for information of this nature. In April, May, June, July, August and September trial runs were made, and the result is surprising.

In the freight trials three British engines and two American (Baldwin) were entered. Each group (not each engine) made eight runs. That is, there were eight British runs and eight American. Each group ran 1,034 miles. The average number of cars per trip was 54 for the American and 57 for the British. The average weight hauled was 760 tons for the American and 868 for the British, these being, of course, long tons. The coal consumed per mile was 62 lbs. by the American engines and 49.4 lbs. by the British. The water evaporated was 7.78 lbs. per pound of coal for the Americans and 9.1 lbs. for the British.

The log of each run is signed by Mr. Machesney, the Baldwin representative, and Mr. Higginson, the Egyptian Railway representative. Mr. Trevithick, Locomotive Superintendent, who forwards the report through the President of the Railway Board and through Lord Cromer, says that the coal was weighed and put on the tender in the presence of the two representatives; what was left at the end of the journey was also weighed in their presence. A second representative arrived from the Baldwins before the departure of the first, and they agreed that further trials were not desirable.

Mr. Trevithick declines to give any opinion or any comparative results as to consumption of oil and cost of maintenance beyond saying that the British engines run easier and demand less attention on the part of the runners, and these facts suggest to him the probability that they will cost less for maintenance and last longer than the American.

In the trials of passenger engines nine runs were made by each group, including six American and two British engines. The average cars per train were 13. The miles run by each group were 1,345. The American engines burned 46.3 lbs. of coal per mile and the British 30.7 lb. The American engines evaporated 6.36 lbs. of water per pound of coal and the British 8.2. The logs of the pas-

senger runs are signed by the same gentlemen as signed the freight runs.

One of the passenger engines was a Baldwin compound. The results of 2,121 miles run by this engine as against 2,687 miles run with Baldwin non-compound engines shows that the compound consumed 45.2 lbs. of coal per mile and the non-compound 45.5 lbs. The compound evaporated 6.13 lbs. of water and the non-compound 6.25. One of the writers very justly observes that the difference is within the probable error of the observations. In other words, it means nothing. Some of the features of the engines may be compared in the table.

	Freight.		Passenger.	
	English.	American.	English.	American.
Boiler pressure, lbs.	140	160	160	160
Diameter of driving wheels.	5 ft.	5 ft.	6 ft. 2½ in.	6 ft. 2½ in.
Cylinders, in.	18 x 24	18 x 24	18 x 24	18 x 24
Total weight (working order), tons	37¼	40¾	45 1/10	45 1/5
Weight on driving wheels, tons	37¼	34	30 1/10	29
Heating surface, sq. ft.	1,125	1,168	1,234	1,251
Number of tubes.	217	192	238	250
Grate area	18.77	17	21.35	21

It is obvious that without knowing more facts than are presented in the descriptions of the engines and in the records of the runs, any attempt to account for the differences in coal consumption would be mere conjecture. Major Johnstone, the President of the Railway Board, warns us against "basing conclusions solely on the totals and averages." There appear to have been no differences of any consequence in the conditions, and it goes without saying that the weather was always warm and fair, and the rail always dry, and serious adverse winds were not likely to have been encountered after April. Indeed, there is no mention of wind except during those of the American passenger engine runs which took place in April. For the moment, therefore, we put the record before our readers without comment.

Two of the members of the Interstate Commerce Commission, Messrs. Prouty and Fifer, have come out strongly in favor of the establishment of a railroad court, such as exists in England, so that the administrative body—the Interstate Commerce Commission—can be relieved of the duty of trying to fulfill the two inconsistent functions of court and prosecutor. These views were expressed at a Congressional committee hearing last Tuesday. We need not tell our readers that we have long considered the establishment of such a court a necessity, if rate questions are to be effectively and fairly dealt with by the Federal Government. The House Committee appears to have aroused a quite general and unusual interest in the railroad problem. It has begun to hold all-day sessions and Commissioners Prouty and Fifer testified on the first day. The subject was the Corliss-Nelson bill, but the whole broad question of railroad regulation was discussed. Messrs. Prouty and Fifer advocated a railroad court of which the members should be appointed for long terms, whose work should relate solely to transportation matters. Mr. Prouty reviewed the situation in England, pointing out that for the past quarter of a century the most important matters of regulation have been decided by such a court, of which one of the members is a judge, sitting most of the time in the superior court. It was not proposed to supersede the Interstate Commerce Commission; the Court should be a true judicial body, dealing only with rate questions, and matters of fact should be left to be determined by the commission as now. This idea is gaining ground. Senator Elkins has spoken in favor of it and a similar view is entertained by other leading Senators. The utterances of Messrs Prouty and Fifer are believed to indicate that the commission itself has fully accepted the idea. The proposal to establish a railroad court led to considerable technical discussion between the witnesses and the members of the committee, and an effort was made to show that the result of such a step would be to create too powerful an engine of control. It was also claimed that under the provisions of existing law legal difficulties would arise. The two commissioners, however, were firm in their contention that the plan was precisely that which would overcome existing legal difficulties and prevent the delays to which railroad cases are now subject when they are appealed from the commission to the courts. Mr. Prouty said that appealed cases were often so technical that the courts did not like to deal with them and such cases therefore were postponed to the last, thus being doubly subject to delay. Answering the claim that to give the commission ultimate authority in determining questions of fact would overburden it with work, the Commissioner said that during the first eight or ten years of its existence the commission was able to perform all the functions which it is now proposed to give to it. He says that the public must not too readily accept the general claim that rates are not now too high. So far, at least, as the opinion of shippers is concerned, there are still many that are too high; within the past three years 800 complaints of excessive rates have been made by shippers. The Committee expects this week to listen to the views of a number of representatives of important railroads on the subject of the proposed amendments to the law.

The other hearings which have been held by the House Committee since our last issue have brought out little or nothing that was new; but the members of the committee have taken a lively interest in the subject and there has been much instructive discussion. The result of this is that the defects of the Corliss-Nelson bill have been made plain, and it appears to be evident that the measure is far from being acceptable to the committee. The representations of the shippers appear, however, to have led the committee to believe that it is very desirable to pass a law of some kind. One correspondent thinks that the committee will probably reject the bill now before it and will draft a new one. The clause making decisions of the Interstate Commerce Commission binding on the railroads, pending appeals to the courts, was declared by a member of the committee to be unconstitutional. Chairman Knapp testified before the committee at one of its hearings, but he seemed to take little interest in the Corliss-Nelson bill. He emphasized only two points. First, that penalties be imposed on the company and not on the agent, and second that the shipper should be punished for accepting illegal rates. But if shippers who took the benefits of the rebates were to be included in the prosecutions, Mr. Knapp argued that they should be confined to shippers having guilty knowledge of the irregularity, as the bulk of small shippers accept as correct the rates given by local agents.

The Philadelphia & Reading is to increase its express train service between New York and Philadelphia by the very substantial addition of six trains each way every week-day. Beginning with the adoption of the spring time-table, May 18, there will be an express train every hour from 7 a.m. to 7 p.m., the trains leaving the Reading Terminal, Philadelphia, and the Liberty Street station, New York, simultaneously, on the even hour. A considerable number of these trains will be run through in two hours, including the ferry trip at New York. The principal reason for this rearrangement and increase of the service is to make the Philadelphia trains independent of the through trains between New York and Washington, which do not run to the Reading Terminal, at Market Street, Philadelphia. Under the present time-table a considerable portion of the local Philadelphia passenger traffic is carried by these Washington trains, and passengers have to change to or from a local train at Wayne Junction, five miles out from the Market street terminal. Such a marked increase in facilities would seem to indicate not only that the passenger traffic between these two cities is large and increasing, but that the officers of the Reading believe that it can be profitably stimulated.

The First Government Accident Report.

The Interstate Commerce Commission has issued its bulletin of train accidents and of casualties to passengers and employees, for the quarter ending Sept. 30, 1901, being the first three months of the operation of the accident law of March 3, 1901. Following is the substance of the bulletin:

"The number of persons reported killed in collisions, derailments, and miscellaneous train accidents is 240, and of injured 2,622. Accidents of other kinds increase the total number of casualties to 11,212 (725 killed and 10,487 injured). These accidents are classified in the following table.

Table No. 1—Casualties to Persons.

	Passengers.		Employees.	
	Killed.	Injured.	Killed.	Injured.
In collisions	44	809	103	896
In derailments	13	419	71	369
Miscellaneous train accidents, including locomotive boiler explosions	0	9	9	120
Total in train accidents	57	1,237	183	1,385
Coupling or uncoupling cars	0	0	30	474
While doing other work about trains, or while attending switches	0	0	14	910
Coming in contact with overhead bridges, structures at side of track, etc.	2	24	29	283
Falling from cars or engines, or while getting on or off	42	380	135	1,568
Other causes	9	485	224	3,741
Totals (other than train accidents)	53	889	432	6,976
Totals, all classes	110	2,126	615	8,361

NOTE.—The bulletin divides employees into four classes.

"The number of passengers killed in collisions and derailments during this quarter—57—is very large, and is equal to more than half of the total shown for 12 months in the Commission's annual report for 1900. The present record is swelled by a single collision in August, in which 28 passengers and three employees of the road were killed. This collision, due to a runaway of freight cars on a long and steep grade, can not be satisfactorily classified as to cause, as the officers of the road report that the cars which ran away had been left on a side track, suitably secured by hand-brakes; and they have not discovered how the brakes were released. The next most serious accident in August, causing the death of nine passengers and one trainman, was also due to some cause not discovered. A passenger train while running at moderate speed was derailed with disastrous results, but no defect was found in cars, engine, or track. It is supposed, therefore, that some obstruction may have been maliciously placed on the track.

"The number of passengers killed in collisions and derailments in July was seven, and in September eight were killed from these causes. In one collision, occurring in July, four passengers and five trainmen were killed and 57 persons were injured. This collision, damaging the railroad company's property to the extent of over $50,000, was due to forgetfulness on the part of the conductor and engineman of a freight train. These two men were killed in the collision. The conductor had served in that capacity 10 months and the engineman eight days. Both had had several years' experience in subordinate positions.

"Of the passengers killed in September, six are accounted for in a single collision, due to the careless movement of a freight locomotive on a track parallel to one on which a fast passenger train was passing. A misplaced switch was overlooked and the engine ran against the side of the passing passenger cars, overturning them.

"The total number of collisions and derailments was 2,249 (1,247 collisions and 1,002 derailments), of which 217 collisions and 90 derailments affected passenger trains. The damage to cars, engines, and roadway by these accidents amounted to $1,842,224, namely: July, $600,047; August, $648,249; September, $593,928. Of the total of $1,842,224, the sum of $1,038,499 is chargeable to collisions and $803,725 to derailments.

"The average loss by each collision was approximately $833, and by each derailment $802. The total amount of damage to property (which does not include damage to merchandise in cars) does not vary much from month to month; yet the individual cases vary greatly. In July, seven accidents caused an aggregate loss under this head $127,210. In August, four accidents cost $91,300, two of these aggregating $70,000. One of these latter was the collision in which 31 persons were killed.

"The diminution in 'coupler accidents,' due to the general use of automatic couplers, may be roughly measured by comparing the present record for three months with one-fourth of the total for one year as shown in former reports. For the year ending June 30, 1900, the Commission reported 282 employees killed in coupling and uncoupling. One-fourth of this number, 70½, is more than twice the number now reported for one-quarter of a year. An appreciable percentage of coupler accidents occurs in what may be called emergency work, such as coupling to a car which has just been in a slight accident, and on account of which the automatic coupler has been taken off the car or is out of order. Such irregular work is practically unavoidable. . . .

"Another point noticeable in the individual reports is the occurrence of accidents to men who have been only a few months in the service, suggesting the need of a period of carefully managed apprenticeship for the proper training of a brakeman. That a considerable percentage of injuries in this class is due to some defect in the coupler is a matter of common knowledge. These defects are often very slight, and many of them are due to lack of intelligent care rather than to faults of material or design. A good share of them are to be classed as unpreventable except by the gradual improvement in design of parts and by added experience on the part of the men."

A table is given, classifying the causes of accidents to employees in coupling and uncoupling. The principal causes are: Sticking of parts (bent pins, etc.) preventing quick work; holding up pin by hand (presumably made necessary by defective uncoupling mechanism); other causes, apparently due to defective coupler mechanism; defective draft gear (with automatic coupler); coupling to an engine or tender; coupling on inside of sharp curve; foot caught in or between couplers while adjusting coupler; slipped (usually on ice or snow); foot caught in frog, guard rail, or switch; caught by overhanging load (on platform car); engaged in operations preliminary to coupling; while coupling safety chains; link and pin coupler; coupling damaged cars (presumably an unavoidable risk); uncoupling without using lever (presumably by reason of defective uncoupling mechanism).

Forty men were injured while kicking or pushing couplers into position with the foot. Half of all the killed and more than half of the injured in coupling are classed as miscellaneous or not clearly explained, which indicates that to make a profitable study of the causes a longer period than three months will probably have to be taken.

A table is also given classifying in detail the accidents which happen to employees in getting on or off cars, falling from cars, etc. It appears that of 135 killed and 1,568 injured in these classes, only 19 killed and 198 injured were cases of falling from the roof of a box car.

"Among the deaths and injuries to employees shown in table No. 1 are 130 cases that are evidently due to operating trains in which air-brakes were used on only a portion of the cars. Of killed there were four and of injured 126, nearly all being brakemen. The total number of collisions and derailments classed as due (1) to rupture or failure of air-brake hose (or other defect in air-brake apparatus, causing automatic application of brakes) and (2) to accidental uncoupling of cars, causing automatic application, is 205, causing damage to the extent of $88,612. The 130 casualties occurred partly in these collisions and derailments and partly in similar mishaps which were not of sufficient importance, as train accidents, to be reported as such.

"Failure or neglect to use air-brakes on a sufficient number of cars may result from any one of three causes: (1) A considerable portion of the cars may be unequipped with air-brake apparatus. (2) A small portion—a very few—of the cars may be unequipped, but

may be placed at or near the front end of the train. (3) On and near steep descending grades the air-pipes on a portion of the cars, in a long train, may be deliberately left unconnected with the avowed purpose of making the train more manageable. Some railroad officers still hold that in consequence of the difficulty of regulating the slack, or the liability of the brake apparatus not being in perfect order, it is safer under some circumstances to regulate the speed wholly or partly by the use of hand-brakes. It is gratifying to state, however, that upon roads having the steepest grades this view has been abandoned, and trains are invariably controlled by power brakes."

The Railroad Gazette Train-Accident Records.

In a preceding article we give the main part of the Interstate Commerce Commission's report of train accidents in the United States for the three months ending Sept. 30, 1901. The records which were published in the *Railroad Gazette* for these three months may be found in the last volume, pages 670, 724 and 794. The principal accident in the first month (July) was the butting collision at Norton, Mo. In this case there was the unusual feature that of the passengers injured, 14 out of 40 died after being taken to hospitals. The most notable accidents in August were those at Nyack, Mont., where besides many passengers, the superintendent of the road and his clerk and a porter were killed; and at Fairville, N. Y., a derailment in which many passengers were scalded. It will be observed that the official report classes this last case as unexplained. The principal accident in September was the collision at Avon, Mass., which was fully reported on by the Railroad Commissioners of that State.

The *Railroad Gazette* record for the 28 years from 1873 to 1900, inclusive, was summarized in our issue of Feb. 15, 1901, page 112; and our record for the half year between Dec. 31, 1900, and July 1, 1901, is given below. Since the last named date, as the reader is aware, we have continued to publish our monthly accounts of the principal train accidents, but have omitted the tabular statements, which were formerly given.

RAILROAD GAZETTE TRAIN-ACCIDENT RECORD; SUMMARY FOR FIRST HALF OF 1901.

Collisions—		
Rear	180	
Butting	106	
Miscellaneous	208	
Total		494
Derailments—		
Defects of roadway	59	
Defects of equipment	124	
Negligence in operating	72	
Unforeseen obstructions	84	
Unexplained	366	705
Other accidents	38	38
Total number of accidents		1,237
Persons killed in train accidents—		
Passengers	50	
Employees	250	
Other persons	19	
Total		319
Persons injured—		
Passengers	437	
Employees	645	
Other persons	25	
Total		1,107

The monthly records, showing these facts in more detail, are to be found in the *Railroad Gazette* for 1901 as follows:

January, page 146.
February, page 241.
March, page 300.
April, page 385.
May, page 502.
June, page 548.

These records fill up the gap between the end of our tabular record and the beginning of the Government's.

Electric Competition and the Boston & Maine.

The statement that has appeared in the press that the Concord & Montreal Railroad was building a line of electric roads from Concord to Manchester, N. H., has been confirmed by statements of those directly interested. The Concord street railroad has recently passed into the control of individuals largely interested in the Concord & Montreal and the Boston & Maine properties and the bonds of the electric line which is being built are guaranteed by the Boston & Maine. The charter which has been obtained gives the company the right to build from Concord to Nashua, but an extension of the line between Manchester and Nashua is not contemplated at present.

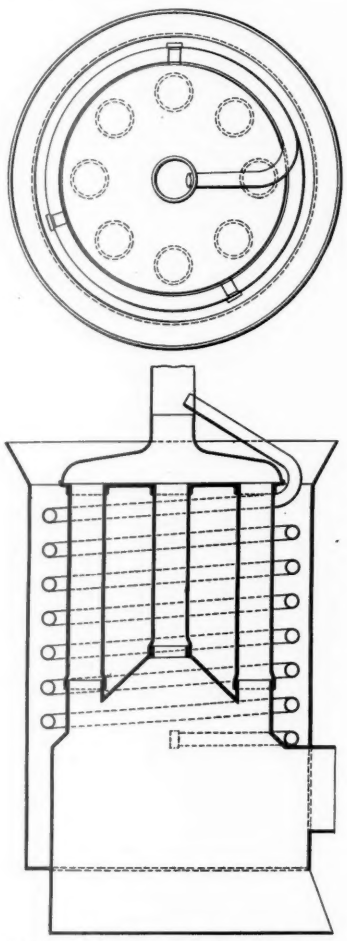
This new electric line parallels the Concord & Montreal, but goes on the opposite side of the river, near the Suncook branch, the result being that the people of Suncook and Hookset are given transportation to Manchester and Concord in a much more convenient way than by the old service of the steam road. The Concord street railroad system runs to Penacook, a few miles above Concord.

It is not the intention of the Boston & Maine to follow out its plan inaugurated a few years since of building electric lines which parallel its own systems, excepting as in this case and in the case of the line from Hampton Beach to Portsmouth it may seem wiser to build an electric line under its own control, than to have an independent competing line established. The indications are that the Boston & Maine Railroad does not, on general principles, believe in an attempt to do a street railroad business or to compete with street railroads in thickly settled centers, and the two lines which it has established in New Hampshire are clearly exceptions to its general policy, and seem the result merely of a desire to fully occupy the field in the sections referred to. The new electric line at Concord will be a portion of the Concord & Montreal property, and be operated under the lease of that system by the Boston & Maine Railroad.

An Improved Sand Dryer.

With the ordinary stove sand dryer it often happens that, as a result of the moisture in the sand, the heat from the dryer will cause the generation of a considerable amount of steam. This steam, first forming pockets, will, when it has acquired sufficient pressure, force its way to the top, causing a sort of miniature eruption and scatter the sand on the floor.

In order to overcome this trouble Mr. Charles Lindstrom, Mechanical Engineer of the Chicago & Alton, devised the arrangement shown in the illustration. He merely adds a coil of pipe to the ordinary dryer, the under surface of which is perforated with ⅜ in. holes spaced 1 in. apart, the lower end being closed and the upper inserted in the chimney of the dryer. In addition to conducting away the steam as fast as it forms, the coil increases the drying surface, through the heat imparted to it by the steam.



Lindstrom's Improved Sand Dryer.

It is claimed that the advantage resulting from this arrangement amounts to 15 per cent. for a given volume of sand, and per pound of fuel. The device is patented by Mr. Lindstrom.

TECHNICAL.

Manufacturing and Business.

C. E. Walker and C. Booth, of the Chicago Pneumatic Tool Co., have gone to Europe.

The Mechanical Locomotive Stoker Co. has been incorporated under the laws of Pennsylvania, with $1,000,000 capital.

Isaac E. Blake, Phelson Building, San Francisco, Cal., writes that he will be glad to communicate with persons having rails, cars and locomotives to sell.

The Improved Rail Joint Co. has been incorporated under the laws of New Jersey, with $100,000 capital, by Adolphus Bonzano, Thomas C. Clarke and John F. Joline.

The Allis-Chalmers Co., during the month of March, sold 52 stone crushing and grinding machines, many of which were sold to railroad companies, principally the Illinois Central.

The Russell Car & Snow Plow Co. has been incorporated in the State of Maine, with $25,000 capital stock, by J. W. Russell, of Boston, Mass., and others. The object of the company is to make cars, snow plows and other rolling stock.

The Steel Re-Utilization Co. has been incorporated in New Jersey, with a capital of $1,000,000, to re-roll steel rails, and make steel ties from worn rails, and has acquired the patent rights in the inventions of James E. York, of New York.

The Foster Engineering Co., of Newark, N. J., has received orders for one 4-in. and one 5-in. Class W pressure regulators to be installed in the engineering plant of the Syracuse University. Also the Grank Trunk Railway has ordered from the company, 75 railroad steam heating valves, to be used in connection with new work.

The car shop of the Chicago, Rock Island & Pacific at Horton, Kan., which, together with all the machinery in the building, was destroyed by fire about two months ago, has been rebuilt within a comparatively short time by working with forces night and day. The S. A. Woods Machine Co., South Boston, Mass., is equipping the shop with a full line of its machines.

By June 1 the Wichita Bridge Co., at Wichita, Kan., expects to have its plant in running order. About $7,000 worth of compressed air machinery is said to have been shipped for the plant. The company is now operating in the factory of the Wichita Mfg. Co., and has contracts for bridges in Kansas, Oklahoma and Indian Territory. Geo. H. Bradford is the Manager.

Edward N. Hurley, formerly President of the Standard Pneumatic Tool Co., now a director in the Chicago Pneumatic Tool Co., sailed for London on Thursday, April 17, to meet President J. W. Duntley, and complete arrangements for the sale of the International Pneumatic Tool Co., of London, to the Chicago Pneumatic Tool Co. The latter company has just taken an order from Europe for 150 pneumatic tools. Its foreign business has increased very rapidly during the past few months.

Under date of April 18, 1902, the following circular has been issued by the Railroad Supply Co. and Q. & C. Co.: "Arrangements have been concluded this day by which, on and after July 1, 1902, the Railroad Supply Co. and the Q. & C. Co. will be operated separately as previous to Jan. 1, 1901, except that all interests pertaining to tie plates have been sold by the Q. & C. Co. and will be hereafter conducted by the Railroad Supply Co. In this division of business interests is included the good will, the best feeling and co-operation of each with the other."

Iron and Steel.

Importation of steel billets from Canada has been begun. One thousand tons were received last week at Baltimore from the Dominion Steel & Iron Co. at Cape Breton.

The American Bridge Co. has the contract for all bridge work on the Atchison, Topeka & Santa Fe for the year 1902. All new bridges on the Rutland R. R. have also been let to the American Bridge Co.

Bids are being received by the Supply & Tender Board, Adelaide, South Australia, for 2,000 tons of 60-lb. rail, 6,500 tons of 50-lb. rail, about 133 tons of fishplates for 60-lb. rail, and 407 tons of fishplates for 50-lb. rail; also 220,000 steel spring washers for ¾ in. bolts for the South Australian Government railroads.

The Golden Gate Iron & Steel Co. filed, on April 22, with the Secretary of State at Trenton, N. J., a certificate of increase of capitalization to $10,000,000, all common stock. The company was recently incorporated with a nominal capital to build a large steel plant at tidewater just outside of San Francisco, Cal.

Although there has been no published advance in the price of steel, leading Eastern makers of structural steel and steel plates are now asking an advance of from $3 to $5 per ton. The limited supply of steel billets and the inability of the manufacturers to make anything like the prompt deliveries required, are given as the causes of the advance in prices.

The Northern Iron Co., of Port Henry, has been incorporated in New York State with a capital stock of $1,000,000. The directors are: W. S. Pilling and P. J. Crane, of Philadelphia, and N. B. Beach, of New York City. It is intended to run the Cedar Point furnace at Port Henry as a separate company, and have the plant in full blast by May 1.

Despatches from Vancouver, B. C., announce that about 10 iron manufacturing concerns in British Columbia have consolidated. These firms are the Vancouver Engineering Company and the Albion Iron Works, Victoria; Albion Iron Works, Vancouver; the Victoria Machinery & Depot Company; the Andrew Gray Iron Works, the Schaake Iron Works, the Dobson Iron Works, Nanaimo, and the Wilson Iron Works.

The officers of the West Virginia Bridge & Construction Co., recently mentioned in the *Railroad Gazette* as having been formed to build a bridge plant at Glenn's Run, W. Va., near Wheeling, are as follows: President, Edward Hazlett; Vice-President, Geo. A. Laughlin; Secretary and Treasurer, G. E. Wincher; General Manager, J. H. Barrett. The general office is in Wheeling. The capital stock is $500,000.

Information gathered by *The Foundry*, of Cleveland, Ohio, shows that there were in the United States at the opening of 1902 a total of 4,615 iron and steel foundries, or a gain of over 11 per cent. in two years. From a detailed analysis of the figures which recently appeared in that journal the conclusion is reached that the foundry capacity of the United States is to-day 30 per cent. greater than it was two years ago.

The United States Tube Co., of Buffalo, was incorpor-

ated in New York State April 12 with $1,000,000 capital, to make metal tubes, flues, pipe and other articles. Of the capital stock, $200,000 is preferred and $800,000 common. The directors are: H. K. Flagler, C. H. Twist, H. C. Diehl, of Buffalo; A. W. Thomson, of Cleveland; G. W. Dickinson, of New York City; G. E. Royce, of Rutland, Vt., and O. S. French, of Fremont, Ohio.

The United States Cold Rolled Steel & Manufacturing Co. was incorporated in New Jersey, April 22, with a capital stock of $100,000. The temporary office of the company is given as 800 Broad street, Newark, N. J. The charter permits the company to roll metals and deal in and make all kinds of iron and steel. The incorporators are: Theodore Wagner, New Britain, Conn.; George B. Aeschbach, 1 Sussex avenue, Newark, N. J., and Otto Aeschbach, 64 Sterling street, Newark, N. J.

The House Committee on Navy Affairs has decided to incorporate in the Naval Appropriation bill a provision for two battleships, two cruisers and two gunboats, to be built at the navy yards. The battleships are to have a tonnage of 16,000 tons each and are to cost, exclusive of armor and armament, not to exceed $4,212,000 each. The armored cruisers are to be of 14,000 tons displacement, to cost $4,659,000 each. The gunboats, of 1,000 tons, are to cost $382,000 each. The bill will carry about $76,000,000, of which about $28,000,000 will be for new ships.

The United States Steel Corporation has given notice of a stockholders' meeting to be held May 19 to authorize the retirement of $200,000,000 preferred stock and the issue of $250,000,000 of bonds. The principal of the new bonds will be payable in 60 years and redeemable at the pleasure of the corporation at the expiration of 10 years, and will bear interest at the rate of 5 per cent. They will be secured by a mortgage lien upon the property and upon the stocks of other corporations now held and owned and hereafter acquired by the United States Steel Corporation. This lien shall be next and similar to that securing the present $304,000,000 bonded indebtedness of the corporation.

The first annual meeting of the Pennsylvania Steel Company was held in Camden, N. J., April 15. The report of the Board of Directors shows the net earnings from operations to be $2,879,272, with $323,559 additional from rent and income from investments and interest. The gross income from all sources was therefore $3,202,831, from which is deducted $550,113 interest on bonded and floating indebtedness, making the net income for the year $2,653,718. From this sum reserves for depreciation amounting to $491,211 is deducted, the net gain of the operating companies for 1901 being $2,161,506. During the year $253,662 was expended for improvements.

Fore River Ship & Engine Co.

Fore River Ship & Engine Co., Quincy, Mass., offers for public subscription 10,000 shares of preferred stock at $100 per share, and of the 10,000 shares of common stock now in treasury one share will be given as a bonus with every two shares of preferred. The capitalization of the company is as follows: Preferred stock, 20,000 shares, $2,000,000; common stock, 20,000 shares, $2,000,000. There is no bonded indebtedness. The preferred stock has a non-cumulative first preference up to 7 per cent. per annum. The earnings of the company for five months to Jan. 1, 1902, were $101,574.

The company has 78 acres of land, bounded by 1¾ miles of water front on Weymouth Fore River at Quincy. The larger buildings comprise a total area under roof of (nearly eleven acres) 451,178 sq. ft. The forge is one of the three large forging plants in this country. The work in progress in Fore River Yard April 1, 1902, was battleships "New Jersey" and "Rhode Island," 15,000 tons each; cruiser, "Des Moines"; torpedo boat destroyers, "Lawrence" and "Macdonough"; seven-masted steel schooner, 11,000 tons displacement, the largest sailing vessel in the world. Forgings for steamships now being built in other yards; steel bridge, 800 ft. long, over Weymouth Fore River: 75 sets forgings for rapid-fire guns, and considerable miscellaneous structural work. This, with other work in hand, will bring the total amount of contracts up to $8,907,000. In addition the company has tenders under consideration for additional work aggregating several million dollars. The directors and officers are: Thomas A. Watson, President; D. H. Andrews, President Boston Bridge Works; Chas. S. Dennis, James B. Dill, Geo. W. Davenport, Secretary and Treasurer; Frank O. Wellington, General Manager; Howard P. Elwell, General Superintendent; William C. Habberley, Auditor.

Deep or Shallow Underground Lines.

In view of the large number of "tube" proposals now awaiting the approval of Parliament, the Board of Trade recently instructed its chief inspecting officer of railroads to proceed to Paris and report upon the new Metropolitan Railroad of that city. The great object of the Paris line is to form a complete system of intercommunication between the different portions of the city, but so far only 6.6 miles is working. The line is laid on the shallow tunnel principle, such as the London County Council proposes to adopt, and the arches as a rule are about 3 ft. 6 in. below the street level. In his report, just issued, Colonel Yorke expresses himself as being far more favorably disposed toward shallow subways than to deep-level "tubes" on account of economy, convenience of passengers, facility for escape in case of mishap, and purity of atmosphere. He does not omit to mention, however, the enormous difficulty presented by the network of sewers, pipes, cables and conduits. The Paris line is worked by 500-volt continuous current, the conductor rails being laid in the 6-ft. way 13 in. away from the running rails. Each train consists of a motor carriage and three trailers, and the current is collected by a shoe to each motor. The lines are double, and the tracks are laid side by side in the same tunnel. The Central London line has a separate tunnel for each track.

Bettendorf Axle Company.

The Bettendorf Axle Co. has decided to build its new car shops at Gilbertown, just east of the city limits of Davenport, Iowa. These will replace the buildings which were destroyed some months ago by fire, and will separate the railroad and wagon departments as far as manufacturing is concerned. The new shops will occupy about 37 acres adjoining the Davenport, Rock Island & North Western and running south to the river. The main building will be 240 ft. x 700 ft., with latest equipment, including cranes and machinery. The plant will have an independent power house. It is said that the outlook for the business of the Axle Company is very promising, and the company has orders for many months ahead. Work on building the new shops will be begun at once. The present plant will be used entirely for the wagon business.

The Delany Rapid Telegraph.

The Delany rapid telegraph apparatus, which, for six months, has been in regular operation on a wire of the Pennsylvania Railroad between Philadelphia and Altoona, is to be extended to Harrisburg and Pittsburgh. During the time mentioned there has been a regular transmission of about 500 messages a day. As railroad messages are considerably longer than ordinary commercial telegrams, it is estimated that the business done is equivalent to 1,000 ordinary messages daily. With the extension of the system to Harrisburg and Pittsburgh the proprietors say that they will do more business over the Delany wires than over any other single telegraph line in the world. This invention was described in the *Railroad Gazette* Sept. 20, 1901.

An Instruction Car for the Santa Fe.

The Atchison, Topeka & Santa Fe has just completed for service a General Instruction Car. Besides the usual air-brake equipment there is a variety of special equipment, including an Axle Light motor and light-controlling apparatus; Pyle electric headlight apparatus; acetylene gas headlight equipment; small model of Vauclain compound cylinders and valve motion; a Nathan locomotive lubricator; a Simplex injector, and a Crosby muffled safety valve. The air-brake apparatus includes equipment for a 20-car train, with sectional views of New York and Westinghouse triple, engineer's and retaining valves; high-speed reducing valve, passenger engine equipment, and a slack adjuster. There is also a six-car train-signal equipment. The car is refitted from a 50-ft. mail car and is provided with Westinghouse friction draft gear and a slack adjuster. There is space for accommodation of a class of 25, besides an office, a closet, and an upper and lower berth. Mr. J. B. McDonald is the instructor in charge.

New Car Houses and Shops—Chicago City Railway.

The plans for this establishment at Seventy-seventh street have been almost completed and the work is well under way. The plant will cover about 15 acres. The car houses will have a capacity for 500 cars, allowing 50 ft. of track to each car, or nearly five miles of storage tracks. The entire space under these tracks will be open, except for the iron pillars supporting the rails, which are 5½-in., 100-lb. A. S. C. E. section. The flooring between the pits is a solid concrete arch, supported by the rail flanges. The shop buildings include a machine shop 202 x 238 ft.; blacksmith shop, 92 x 200 ft.; wood working shop, 92 x 224 ft.; paint shop, 92 x 175 ft.; carpenter shop, 92 x 178 ft.; and several smaller buildings. They are all to be of brick and iron construction and all machinery will be electric driven. It is the intention to put in a surface transfer table, as the location for the table is such that a pit would close up an alley in the property that must be kept open.

THE SCRAP HEAP.

Notes.

The New York, New Haven & Hartford has taken off one man from each freight train crew on the New York and Shore Line division.

A Chicago paper says that the Chicago & Alton will hereafter hire no new men over 35 years old. The rule applies to all departments, including the shops.

The Southern Pacific has secured the punishment of a number of ticket brokers in San Francisco for violating an order of the Court forbidding them to deal in certain excursion tickets. One broker was fined $250, another $150 and two clerks $50 each.

The proposal to limit passenger fares in Massachusetts to two cents a mile, which was carried in the lower house of the legislature by a large majority, was killed in the Senate, on Monday last, in the short space of ten minutes. Only three senators voted in favor of it. At a committee hearing on the bill last week representatives of the Brotherhood of Locomotive Engineers appeared and argued against the reduction.

The Galveston, Houston & Henderson has put up a metallic-circuit telephone line the whole length of its road (Galveston to Houston, 50 miles), connecting, on this one line, all of the stations as well as the city offices. On each freight train there will be carried a telephone in the caboose, so that, by the aid of a connecting board outside of each station building, the conductor of a freight train can communicate with the superintendent's office at any time, day or night.

A press despatch from Chicago says that all of the Eastern roads and two of the Western—the Chicago, Milwaukee & St. Paul and the Chicago & North Western—together with the Illinois Central and the other southern roads east of it, have agreed to absorb the switching charges on cars delivered to industries within the Chicago district. This will virtually give hundreds of factories a reduction of $3 to $5 a car on their bulk freights. What effect will such a move have on the proposal to change the basis on which switching roads shall pay for the use of hired cars?

The R. S. Brine Transportation Company, of Boston, among whose teamsters originated the recent strike in that city, has begun proceedings in equity in the United States Circuit Court against the Boston & Maine Railroad for discriminating against Brine's teamsters. Before the strike the men in the freight houses assisted teamsters, when necessary, but now they refuse to give help to plaintiff's teamsters. At the time of the settlement of the strike an officer of the Boston & Maine stated that is freight-house men would be allowed to do as they pleased about helping teamsters; they would not be required to help anyone, nor would they be forbidden to do so.

It is announced that the New York, New Haven & Hartford and the Boston & Maine will this summer run a through night passenger train between New York city and Portland, Me., by way of Worcester and Nashua. The eastbound train will start at 9 p. m. and run through in 9 hours 30 minutes. On the line between New York and the White Mountains, by the way of Springfield, Mass., and Wells River, Vt., there will this year be two through express trains each way instead of one, as in former seasons. The new train will run at night, the eastbound leaving New York at 9 p. m. The Northern Pacific will, on May 4, put on a third through passenger train between St. Paul, Minn., and Portland, Ore.

A 4,000-ton Train of Coal.

On Sunday, April 20, the Philadelphia & Reading moved a trainload of coal from Reading to Philadelphia which weighed, exclusive of the engine and caboose, 4,018 tons. The train consisted of 61 cars, of which 57 were of 100,000 lbs. capacity. The air-brakes were connected up on the first 40 cars. The engine was No. 1,034, and the time from Reading to Abrams (39 miles) was three hours.

No Legislation for the Grand Central Station.

The Governor of New York has vetoed both of the bills passed by the Legislature which has recently adjourned, which were designed to provide for the enlargement of the Grand Central station terminal grounds in New York city and the equipment of the line through Fourth avenue tunnel with apparatus for using electric motive power; and this action of the Governor leaves the situation just where it was before the Legislature took any action, no bill of any kind having been passed. In view of the fact, as stated by the officers of the railroad company, that under existing laws they are forbidden to use in the tunnel any other motive power than steam, it would seem that legislative authority for carrying out the plans which the company has announced for electrifying these tracks must remain in abeyance until next winter; although, in view of the long time necessary to complete the necessary machinery and structures, and the known sentiment of the public, it cannot be that this necessarily means the entire suspension of the improvement. Work can go on, with the assurance that the disuse of steam will be approved by the Legislature in ample time. The Governor's veto was based on the claim of the New York city authorities that the Bedell bill, giving the state railroad commission authority to approve the taking of lands by the railroad company, would wrongfully deprive the city authorities of their control of streets and public places and this bill being vetoed, the Governor held that the other bill, that of Mr. Apgar, compelling the adoption of electric power within three years, should also be rejected, for it would not be fair to compel the railroad to make this proposed improvement while restricting the company's power to acquire additional right of way. For any additional land taken from the streets the city government could give a franchise only for a period of 25 years, whereas the railroad company, throughout all the rest of its line, has a perpetual franchise.

A Fast Run on the Lackawanna.

Train No. 9, of the Delaware, Lackawanna & Western, drawn by engine No. 973, Engineman Still, on the morning of April 8, made the run from Mount Morris, N. Y., to a full stop at Buffalo station, 62.3 miles, in exactly 61 minutes. The run from Mount Morris to Linwood up a 34-ft. grade, 12.6 miles, was made in 13 minutes. This is the regular heavy night express, leaving Hoboken at 9 p.m. At the two crossings with the Pennsylvania road, one at Mount Morris and the other at Buffalo, the train was brought under control; and a full stop was made for the Nickel Plate crossing. The train passed through East Buffalo yard, three miles, and through the yard between Nickel Plate Junction and the station at Main Street, Buffalo, at about 30 miles an hour. Engine No. 973 is one of the new ones recently received from the Schenectady shops.

The Memorial Bridge at Washington.

The Secretary of War has sent a letter to the Speaker of the House of Representatives suggesting legislation for the laying of the corner stone of the proposed Memorial bridge across the Potomac River, during the Grand Army encampment at Washington, in October next. An appropriation of $100,000 for beginning work on this bridge has been included in the Sundry Civil appropriation bill which has been passed by the House of Representatives.

Steamboat Disaster on the Ohio.

On the morning of April 20, the steamer "City of Pittsburgh," sailing down the Ohio river, was destroyed by fire near Caledonia, not far from Cairo, Ill., and over 70 lives were lost. The number of persons on the vessel was 150, of whom 66 were passengers. One lifeboat filled

with passengers reached the shore, but no other persons were saved except those who were able to reach the shore by swimming.

The River and Harbor Bill.

The river and harbor bill was passed by the U. S. Senate on Monday, April 21. A considerable number of amendments were made by the Senate to the bill as passed by the House of Representatives, the tendency of which is toward larger appropriations which may not all be agreed to by the House or in conference, and the details of which are not available at this writing.

Technical Training and Administration.

On the morning of May 9 (11 o'clock) Mr. Alfred Walter, President of the Lehigh Valley Road, will deliver a lecture before the students and faculty of the Lehigh University on "Technical Training as an Aid to Administrative Methods." This is one of the series of lectures delivered weekly, which lectures are open to the public so far as the accommodations of the room will permit.

LOCOMOTIVE BUILDING.

The Southern Indiana is having two locomotives built at the Baldwin Works.

The Chicago, Burlington & Quincy is having 25 locomotives built at the Rogers Works.

The Huntington & Broad Top Mountain is having a locomotive built at the Baldwin Works.

The Algoma Central & Hudson Bay is having an engine built at the Canadian Locomotive Works.

The Manufacturers' Ry. is having two locomotives built at the Richmond Works of the American Locomotive Co.

The Delaware & Hudson is having four locomotives built at the Dickson Works of the American Locomotive Co.

The Mexican National has placed with the American Locomotive Co. two orders for 40 locomotives each, part of which will be filled at the Brooks and part at the Cooke Works. This includes the order reported in our issue of March 14.

The Chicago, Burlington & Quincy order for 50 locomotives, 25 with the Baldwin Locomotive Works and 25 with the American Locomotive Co., reported in our issue of April 18, calls for the following simple consolidation engines, November and December delivery. They will weigh 208,000 lbs., with 185,000 lbs. on the driving wheels, and have 22 x 28 in. cylinders and 57 in. drivers; radial stay boilers, with a working steam pressure of 210 lbs., and have 480 tubes, wide fire-boxes, tender capacity of 6,000 gallons of water and 12 tons of coal. Acetylene headlights and Chicago, Burlington & Quincy sanding devices.

The Gulf & Ship Island order for six engines, reported in our issue of April 11, is as follows: To be built by the American Locomotive Co., for September to December, 1902, delivery; type, simple, ten-wheel; weight on drivers, 109,000 lbs.; total weight, 140,000 lbs.; cylinders, 20 x 26 in.; drivers, 56 in.; extended wagon-top boilers; working steam pressure, 170 lbs.; 292 tubes, 14 ft. x 2 in.; fire-box, 108 x 42 in., of carbon steel, made by Worth Bros., Coatesville, Pa.; grate area, 4,536 sq. ft. Special equipment includes Westinghouse brakes, Hammond steel axles, 5 x 9; K. & M. magnesia boiler lagging, Sterlingworth brake-beams, Lappin brake-shoes, Tower couplers, Monitor injectors, Ajax journal bearings, U. S. piston-rod packings, Allen valve-rod packings, Crosby safety valves, Walters' sanding devices and French springs.

The Illinois Central order for locomotives with the Rogers Works, reported in our issue of April 11, should read 20 instead of 22. These engines are simple consolidations; weight on drivers, 154,000 lbs.; total weight, 175,000 lbs.; cylinders, 20 x 28 in.; drivers, 56½ in.; extended wagon top boilers, with a working steam pressure of 200 lbs. These will contain 336 tubes of the Illinois Central's special type, made by the National Tube Works; length, 14 ft. 7⅝ in.; outside diameter, 2 in. The fire-box will be 108 x 72 in., of carbon or Otis steel; tank capacity, 7,000 gal. of water; 15 tons of coal. The special equipment includes Westinghouse air-brakes, Lappin brake-shoes, M. C. B. automatic couplers and Westinghouse friction draft gear; Nathan simplex and Ohio injectors, U. S. or Jerome piston rod packing and valve rod packings, Ashton safety valves, Leach sanding devices and Nathan triple sight-feed lubricators.

The St. Louis & San Francisco order for 40 locomotives, reported in our issue of April 11, is as follows: From the American Locomotive Co., 10 simple consolidations for July, 1902, delivery; weight on drivers, 158,000 lbs.; total weight, 176,000 lbs.; cylinders, 22 x 28 in.; drivers, 57 in.; extended wagon-top boilers; 303 tubes of charcoal iron, 14 ft. 6 in. x 2¼ in.; fire-box, 99⅛ x 68 in.; Illinois Steel Co.'s flange steel; tank capacity, 6,000 gal. of water; coal capacity, 12 tons.

From the Baldwin Works, for October, 1902, delivery, 10 ten-wheel simple passenger engines; total weight, 170,000 lbs.; weight on drivers, 135,000 lbs.; cylinders, 21 x 28 in.; drivers, 68 in.; extended wagon-top boilers; 303 tubes, charcoal iron; fire-box, 99⅛ x 68 in., of carbon steel, by Park Bros.

From the Baldwin Works, also, 10 Vauclain and 10 tandem ten-wheel compound engines, for October, 1902, delivery; cylinders, 15½ and 26 in., 28 in. stroke. Other details not yet available, but will be practically the same as the 10-wheel passenger engines mentioned above.

The special equipment for these various types of engines includes hammered iron axles on the consolidations and Bethlehem nickel-steel for the others; Sterlingworth brake-beams, Streeter brake-shoes, Dressel 18 in. and Pyle National electric headlights, No. 10 Hancock injectors, Johnston's safety valve No. 3, Nathan lubricators and Davis wheel centers. Crosby gages are used on all types. The ten-wheel passenger engines have driving boxes, main and side rods of Damascus nickel bronze. Cabs of steel.

The Southern order for locomotives, reported in our issue of April 11, is as follows: 35 simple consolidation engines from the American Locomotive Co.; weight on drivers, 143,000 lbs.; total weight, 158,000 lbs.; cylinders, 21 x 28 in.; drivers, 56 in. on 20 of these engines and 60 in. on 15; working steam pressure, 200 lbs.; 271 tubes, 2 in. in diameter, 14 ft. 8 in. long. Twenty of these engines will have narrow fire-boxes, 42 x 102 in., and 15 will have wide fire-boxes, 66 x 87½ in.; grate area, narrow fire-box, 30 sq. ft.; wide fire-box, 40 sq. ft.; tank capacity for water, 5,000 lbs.; for coal, 10 tons.

Thirteen simple consolidation engines, 10 to be used on the Southern and three for the Alabama Great Southern, were ordered from the Baldwin Locomotive Works. These weigh 143,000 lbs. on drivers; total weight, 158,000 lbs.; cylinders, 21 x 28 in.; drivers, 60 in., and specifications in general the same as for the narrow fire-box engines above.

Two six-wheel switch engines were ordered from the Baldwin Works, total weight, 100,000 lbs.; cylinders, 19 x 24 in.; Richardson balanced slide valves; diameter of driving wheels, 50 in.; Latrobe tires; fire-box, 75 x 33 in.; tubes, 184 in number, 2 in. in diameter; total heating surface, 1,500 sq. ft.; total grate surface, 17½ sq. ft.

Ten-wheel passenger engines, number not yet determined, are to be built at the Baldwin Works. These are simple and weigh 134,500 lbs. total; driving wheels, 69 in. in diameter; fire-box, 96 x 42 in.; total heating surface, 1,736 sq. ft.

Ten eight-wheeled passenger engines were also ordered from the Baldwin Works. These are simple and weigh 110,000 lbs. total; diameter of driving wheels, 66 in.; wide fire-boxes, 96 x 66 in.; 324 tubes; grate surface, 44 sq. ft.

Four six-wheel switch engines were also ordered from the Baldwin Works. These are simple; total weight, 116,000 lbs.; cylinders, 19 x 24 in.; fire-box, 95 x 33¼ in.; 242 tubes, 2 in. in diameter; total grate surface, 22 sq. ft.

The specifications for all the above locomotives include Westinghouse American air-brakes, Magnesia K. & M. boiler lagging, Sterlingworth brake-beams, Hancock injectors, Coale safety valves, Nathan sight-feed lubricators, Scott springs and Latrobe tires.

CAR BUILDING.

The Cuba Co. has ordered 24 coaches from the American Car & Foundry Co.

Mackenzie & Mann have ordered 100 box cars from the Crossen Mfg. Co., Cobourg, Ont.

The Delaware Valley has ordered five freights from the Sterlingworth R. R. Supply Co., Easton, Pa.

The Central of Georgia officially denies that it is in the market for passenger cars at the present time.

The Cincinnati, Hamilton & Dayton has ordered 300 coal cars from the American Car & Foundry Co.

The Chicago & North Western has ordered 1,000 box and 2,000 coal cars from the Pullman Company.

The Mobile & Ohio is reported to have ordered 300 40-ton coal cars from the American Car & Foundry Co.

The New York, New Haven & Hartford is having 200 freights built at the Keith Mfg. Co., Sagamore, Mass.

The United Power & Transportation Co. has ordered 18 motor car bodies from the American Car & Foundry Co.

The Mexican Ry. has ordered three combination baggage and mail cars from the American Car & Foundry Co.

The Louisville & Nashville has ordered four combination coach and cafe cars from the American Car & Foundry Co.

The American Car & Foundry Co. is building, for miscellaneous parties, 105 tank cars, 50 mine cars and 42 logging cars.

The Globe Construction Co. has ordered two combination plaster and baggage cars from the American Car & Foundry Co.

The Old Dominion Nail & Iron Co. is having four freights built at the Madison Works of the American Car & Foundry Co.

The Pennsylvania is having 17 coaches built at the Pullman Works, in addition to the order reported in our issue of March 14.

The Mather Stock Car Co. is having 100 cars built at the South Baltimore Car Works, in addition to the order reported in our issue of Jan. 17.

The St. Louis & San Francisco is reported to have ordered 700 coal, 700 box and 150 flat cars and 45 cabooses from the American Car & Foundry Co.

The Vandalia has ordered 11 passenger coaches and five combination cars from the Niles Car & Mfg. Co., both classes to be 70 ft. long between sills.

The Louisiana & Arkansas has ordered from F. M. Hicks 20 flat cars of 50,000 lbs. capacity, 36 ft. long, rebuilt by the Hicks Locomotive & Car Works.

The St. Louis Southwestern, in addition to the order reported March 14 has ordered 75 ballast cars and 60 box cars from the American Car & Foundry Co.

The Jamestown, Chautauqua & Lake Erie has ordered from F. M. Hicks 17 flat cars of 40,000 lbs. capacity, 34 ft. long, rebuilt by the Hicks Locomotive & Car Works.

The Kansas City, Mexico & Orient has ordered 15 flat cars from the American Car & Foundry Co. This is the new Stilwell line which is now building south from the Cimarron River in Oklahoma. A. E. Stilwell, Kansas City, is President.

The Chicago, Burlington & Quincy order for 1,000 stock cars, 500 to be built by the American Car & Foundry Co. and 500 at its own shops at Aurora, reported in our issue of April 18, will be of 60,000 lbs. capacity, for July, August and September delivery. The cars will be 36 ft. long and 9 ft. 6 in. wide, with wooden underframes, M. C. B. axles, C., B. & Q. brake-beams, brake-shoes and brasses, and single board roofs.

The Rutland order for 300 box cars, reported in our issue of March 14, is as follows: Capacity of cars, 60,000 lbs.; length, 34 ft. 7½ in., over sills; width, 8 ft. 11¾ in., over sills; height, 7 ft. 6 in. To be built of wood. Axles, 4¼ x 8 in., M. C. B.; Simplex bolsters, Sterlingworth brake-beams, Westinghouse brakes, Tower couplers, Miner draft rigging, Rutland paint, Murphy roofs, No. 3 arch bar trucks and cast-iron wheels.

The Terre Haute & Indianapolis order with the Niles Car & Mfg. Co. calls for 11 passenger coaches and five combination passenger and baggage cars, for October delivery. The cars will all be 70 ft. long, 10 ft. 1¾ in. wide and 14 ft. 9⅛ in. high. The special equipment for all includes wooden underframes, metal brake-beams, Westinghouse high-speed air-brakes, Pennsylvania R. R. standard steam heating system, electric storage battery lights, Standard steel platforms, six-wheel trucks, and Buhoup vestibules.

The International & Great Northern order with the American Car & Foundry Co. for 300 flat cars includes the following specifications: Capacity of cars, 80,000 lbs.; weight, 28,000 lbs.; length, 36 ft.; width, 9 ft.; height, 4 ft. ½ in.; cars to be built of wood, with I. & G. N. cast-iron brake shoes, Westinghouse air-brakes, I. & G. N. standard brasses, Tower couplers, I. & G. N. standard dust guards, I. & G. N. standard journal boxes, I. & G. N. standard paint, A. French Spring Co.'s springs, steel trucks and cast-iron wheels.

The St. Louis, Kansas City & Colorado order with the American Car & Foundry Co., reported in our issue of April 18, calls for 175 coal and 85 flat cars, of 80,000 lbs. capacity, for August and September delivery. The coal and flat cars are 36 ft. 4½ in. long, 9 ft. 2½ in. wide, and 4 ft. high, inside measurement. The special equipment of the coal and flat cars includes Scullin-Gallagher pressed steel brake-beams, Westinghouse air-brakes, Missouri Pacific M. C. B. automatic couplers, American continuous draft rigging, 5 x 9 in. journal boxes, American Car & Foundry Co.'s standard paint, 33-in. cast-iron wheels.

The order with the Mt. Vernon Car Mfg. Co. calls for 25 box cars of 70,000 lbs. capacity, and two cabooses. The box cars will be 36 ft. 8 in. long, 9 ft. ¾ in. wide, and 8 ft. high. The cabooses will be 29 ft. 10 in. long, 8 ft. 10 in. wide, and 6 ft. 4 in. high. The special equipment for the box cars includes Scullin-Gallagher cast-steel bolsters, Schoen pressed steel brake-beams, Westinghouse air-brakes, Western equipment, flush side and end-doors, 5 x 9 in. journal boxes, American Car & Foundry Co.'s standard paint, and 33-in. cast-iron wheels. The special equipment of the cabooses includes metal brake-beams hung from trucks, Westinghouse air-brakes, 4 x 8 in. journal boxes, American Car & Foundry Co.'s standard paint, four-wheel standard trucks, passenger style, and 33-in. cast-iron wheels.

BRIDGE BUILDING.

Arkansas.—The bridge to cross White River, mentioned in this column April 11, p. 275, as for the White River Ry., is on the extension of the Missouri Pacific. See Railroad Construction column this week.

Atchison, Kan.—It is said the County Board is about to ask bids on six bridges.

Bangor, Me.—The American Bridge Co. has been awarded the contract for the new highway bridge over the Penobscot River between Bangor and Brewer. Its total bid was $24,500.

Barry, Minn.—This town has recently voted $12,000, part of which will be used for a bridge over Kettle River. S. W. Anderson, Clerk, Hickley, Minn.

Boston, Mass.—The Board of Aldermen are considering a resolution to have the City Engineer make plans for a new bridge on Harvard street over the tracks of the New York, New Haven & Hartford.

Brookville, Ind.—May 8 is the date on which bids are wanted for the steel truss bridge over Templeton's Creek, mentioned last week.

Buffalo, N. Y.—The Board of Aldermen are considering regrading and building bridges on Amherst street where that street crosses the Exposition grounds.

The contract for building the bridge over Black River Harbor at Ferry street is let to the Owego Bridge Co. at $26,860.

Canajoharie, N. Y.—The Governor has signed the bill appropriating $22,680 for a drawbridge over the Erie Canal at this city. The State Engineer will make the plans.

Columbus, Ga.—On April 19 the bill authorizing a bridge across the Chattahoochee River between Columbus, Ga., and Eufaula, Ala., was passed by both the U. S. Senate and House of Representatives.

Deseronto, Ont.—The Bay of Quinte Railway Company will build a steel bridge across the bay to Prince Edward County.

Des Moines, Iowa.—A resolution directing the City Engineer to prepare preliminary plans for the proposed viaduct over the tracks of the Keokuk & Western on South Eighteenth street, at the foot of Babs' Hill, has been adopted. The preliminary plans will have to be submitted to the State Board of Railroad Commissioners before the viaduct can be ordered.

Detroit, Mich.—A bill was introduced in the U. S. Senate on April 17, and referred to the Committee on Commerce, authorizing a bridge across the Detroit River, at Detroit. (April 11, p. 275.)

Easton, Pa.—It has been decided to build a low truss iron bridge, 40 ft. long and 18 ft. wide, over the Pequest Creek at Allamuchy.

The Lehigh & New England is about to award contracts for its new bridge over the Delaware River near Easton.

Elizabethtown, Ohio.—Plans are said to have been made by County Engineer Krug for replacing the bridge across the Big Miami River near this town.

Florida.—The U. S. Senate on April 19 passed the bill authorizing the United States & West Indies R. R. and Steamship Co. to build a bridge across the Manatee River, in Florida.

Geddes, N. Y.—The State Board of Railroad Commissioners has approved of the joint application of the Solvay Process Co., the town of Geddes and the New York Central R. R. for permission to build a 500-ft. overhead girder bridge across the tracks of the New York Central, the Delaware, Lackawanna & Western and the West Shore roads, near the old Van Vleck road in Geddes. The cost will be about $40,000.

Goshen, N. Y.—Bids are wanted April 28 for the substructure of two bridges over Wallkill Creek. V. K. Mills, Engineer.

Grand Rapids, Mich.—L. W. Anderson, City Engineer, writes us that the plans and specifications are not yet made for the two bridges proposed over Grand River. Each bridge, however, will be about 500 ft. long and the total cost will be about $180,000. One bridge will be a steel and concrete structure; the other will be a truss with a draw span.

The proposed viaduct to span the railroad tracks at the Bartlett street crossing is again under consideration. The City Engineer has made an estimate and submitted his report for a steel truss bridge, with a concrete roadway, the estimate being $101,860. The Board of Aldermen will probably take the matter up soon.

Gray's Point, Mo.—The American Bridge Co. has been given the contract for the steel work for the big bridge to cross the Mississippi River between Thebes, Ill., and Gray's Point, Mo., which has been frequently referred to in this column and illustrated in our issue of March 14. The contract involves about 13,000 tons of metal.

Hagerstown, Md.—Daniel W. Doub, Henry Holzapfel and John E. Rowland have petitioned the Board of County Commissioners of Washington County for permission to build a bridge over a creek to Mt. Aetna in Washington County.

Haverhill, Mass.—The State Highway Commission is considering rebuilding the River street bridge at Bradley's Falls.

Holyoke, Mass.—James L. Tighe writes that bids will be advertised for pretty soon by the Board of Public Works for the 100 ft. iron bridge on Main street over the third level canal. The estimate is $11,000.

Ithaca, N. Y.—City Engineer Crandall has been ordered by the Mayor to make plans for a bridge over Six Mile Creek at Albany street.

Kansas City, Mo.—Reports state that the various railroads interested in the viaduct over the Union Pacific and the Chicago, Rock Island & Pacific tracks at Tenth

street have decided to build at once. The plans said to be approved provide for a structure 40 ft. wide and about 1,000 ft. long at a cost of about $80,000. The work will be carried on under the supervision of the City Engineer.

KINGSTON, N. C.—The U. S. Senate on April 19 passed the bill, previously passed by the House of Representatives, authorizing the Kingston & Carolina R. R. to build a bridge across the Neuse River.

LANCASTER, PA.—The County Commissioners want separate bids until May 16 for the masonry and for the steel superstructure for a 125-ft. bridge across the Pequea Creek. Bids will also be received at the same time for a stone arch bridge with two arches of 40-ft. span to cross the same creek at the same place. A. B. Hassler, County Controller.

LANSING, MICH.—The Michigan Suburban Ry. is reported to have made an agreement with the Pere Marquette whereby the former company is to build a viaduct, with a single span of 125 ft., over the tracks of the latter company at Center street crossing.

LUCKNOW, ONT.—A new bridge will be built at Campbell street.

MANKATO, MINN.—A committee is soliciting additional funds to have the pontoon bridge built across the Minnesota River at the foot of A street.

MILAN, MO.—Chas. W. Reeves, County Surveyor, will, on May 7, let contracts for five steel bridges varying in length from 28 ft. to 60 ft.

MILWAUKEE, WIS.—According to local report bids with plans and specifications will soon be wanted for the bascule bridge at West Water street. The old bridge at that point will be moved, probably to the foot of Greenfield avenue or Washington street.

MINDEN, N. Y.—The Governor has signed the bill appropriating $6,500 for a bridge across the creek in the town of Minden, Montgomery County.

MISSISSIPPI.—The House of Representatives on April 19 passed a bill authorizing the New Orleans & Mississippi Midland R. R. to build a bridge across Pearl River, in Mississippi.

MT. VERNON, IND.—We are told that the Posey County Commissioners have plans on file for five steel bridges on which bids are being received. A bond equal to the amount of bid must accompany all bids. Address Silas G. Howard, County Auditor.

NEWBURYPORT, MASS.—It is said the County Commissioners have asked the Legislature for permission to spend $300,000 for the proposed new bridge over the Merrimac, as the $200,000 allowed is not sufficient to pay for the work. The bids on this work were mentioned April 11, p. 275.

NEWPORT, TENN.—It is said that the Cocke County Court has ordered four bridges to cost about $40,000. They will be located at Del Rio, Bridgeport, Newport and Oldtown.

OWEGO, N. Y.—The Town Boards of Tioga and Owego have decided to build a new bridge over Owego Creek at the Leach Mill crossroad. It is said bids are being received.

PADUCAH, KY.—In regard to the reports that the Illinois Central will rebuild its bridge over the Tennessee River near Gilbertsville, we are told that the company is not likely to rebuild at present. The company has, however, been making surveys to use when it becomes necessary to renew the Tennessee River bridge.

PAINESVILLE, OHIO.—The County Commissioners are again considering building a bridge over Chagrin River a mile south of its mouth.

PAWNEE, OKLA. T.—The Commissioners are asked to build the proposed bridges at once.

PERTH AMBOY, N. J.—It is said that the Middlesex County Board of Freeholders has accepted plans made by the American Bridge Co. for a new bridge over the Raritan River between Perth and South Amboy. The structure will cost about $150,000, and an election will be held on June 9 to decide whether it shall be built or not.

PHILADELPHIA, PA.—At the first regular session of both branches of the City Councils on April 17, a large list of bills for bridge work was introduced. Many of these bridges have been mentioned before in these columns and will be mentioned again only when action is taken.

PLYMOUTH, PA.—It is reported that the Central R. R. of New Jersey is about to build a bridge over the Susquehanna River near Plymouth.

PORTLAND, MICH.—It has been voted to repair the Grand River bridge.

QUINCY, CAL.—Bids are wanted May 5 for a steel bridge over Feather River. H. C. Flourhoy, Clerk.

READING, PA.—Bids will be received at the County Controller's office until April 30 for repairing and rebuilding five county bridges injured or destroyed by the spring freshets. Plans are with the County Commissioners.

The viewers appointed by the Dauphin County Court have recommended a new bridge to be built at Cross Keys over the Schuylkill at an estimated cost of $8,300, and that the expense be paid by the State. The bridge will be about 118 ft. long.

RENSSELAER, N. Y.—The question of building the highway bridge over the railroad tracks at Third avenue is again under consideration.

ROME, N. Y.—The Governor has signed the bill appropriating $20,000 for a new bridge over the Erie Canal at South James street. The State Engineer will make the plans.

SAUGATUCK, MICH.—The Township of Saugatuck has voted to issue $8,000 of bonds for a new steel drawbridge over the Kalamazoo River, replacing the wooden structure. The Township Board is considering getting bids. (April 4, p. 256.)

SHREVEPORT, LA.—On April 19 the bill authorizing the Shreveport Terminal Co. to build a bridge across Red River, in Louisiana, was passed by both the U. S. Senate and House of Representatives.

SOUTH VALLEY, N. Y.—The Governor has signed the bill appropriating $21,000 for a bridge over the Allegheny River in this town, near Onoville Post Office. Address the State Superintendent of Public Works.

SYRACUSE, N. Y.—The Governor has signed the bill for a liftbridge at North Salina street over the Oswego Canal. The sum of $27,500 is appropriated by the State, and $10,000 by the Syracuse Rapid Transit Co. The State Engineer will make the plans.

TENNESSEE.—The U. S. Senate on April 19 passed the bill authorizing the Tennessee Central Ry. to build a bridge across the Emory River, in Tennessee.

The bill authorizing the Nashville Terminal Co. to build a bridge across the Cumberland River, in Davidson County, Tennessee, was also passed by the U. S. Senate.

TOLEDO, OHIO.—The contract for building the substructure of the Toledo Railway & Terminal Co.'s lower bridge is awarded to Williams Bros. & Morris, of Cleveland. The contract amounts to $100,000. (April 4, p. 252.)

TORONTO, ONT.—A new bridge across Bellwood's Park Ravine at Crawford street is under consideration.

VANCOUVER, WASH.—The Northern Pacific has a bill before Congress for permission to build a bridge over the Columbia River at Vancouver on a proposed extension of the Washington & Oregon Ry.

VICKSBURG, MISS.—Something might be done soon in the way of letting contracts for the Vicksburg Park Improvement which includes new roads with several viaducts. Wm. T. Rigby, Commissioner.

WALKERVILLE, ONT.—Owen McKay, Chief Engineer of the Lake Erie & Detroit River, writes us that bridges are required over the Thames River and over Kettle Creek on the London & Port Stanley Division. Each will be about 180 ft., and the total cost will be about $25,000. The plans are not yet completed.

WASHINGTON, D. C.—Lieut. Col. Charles J. Allen, Corps of Engineers, U. S. A., has written, in answer to a query from the Senate District Committee, an opinion favoring a new aqueduct bridge, as proposed in a recent Senate bill. The District Commissioners in their report on the bill said that the old bridge might be repaired at a cost of $90,000 so that it would be serviceable for ten years more. They were averse to the new bridge planned by the Senate Committee, which is a steel structure to cost $860,000, and stated that they would prefer to wait a few years for a more expensive stone structure, the cost of which would be $1,250,000. Colonel Allen is against the Commissioners' plan. He says that the old bridge might need much more than $90,000 worth of repairs. He also says that the bridge is very old, and that even when repaired ought not to be expected to be serviceable for ten years. He expresses the idea that a steel bridge would be exceedingly serviceable, and not out of harmony with the Park Commission plan.

WATERLOO, IOWA.—The Crooked Creek Bridge on the Illinois Central was burned April 11. It will be rebuilt, but with considerable expense to the company.

The B. C. R. & N. will build a new steel girder bridge across the Blackhawk with stone abutments.

WELLSBORO, PA.—Viewers have recommended to the court the building of county bridges over Sand Run, and at Phillips Station. In the matter of rebuilding two bridges over Mill Creek, destroyed by the late flood, it was reported that the cost of the work would be over $10,000.

WEST CHESTER, PA.—Viewers have recommended an inter-county bridge over Octoraro Creek at Griest's Fording between Chester and Lancaster Counties.

WILKESBARRE, PA.—The County Commissioners are locating sites for 37 bridges which are to be built this summer. The prices range from $150 to $1,200, and the total cost will be $15,000. Seven of these are iron and 30 stone arch bridges. Bids will probably be wanted the last of May.

ZANESVILLE, OHIO.—Bids are wanted May 8 for repairing the Third street bridge at a probable cost of $6,000. George B. Hibbs, County Auditor.

Other Structures.

ATLANTA, GA.—The plans made by Bradford L. Gilbert for the new union passenger station in Atlanta have been approved by the Governor and accepted by most of the railroads.

BEAUMONT, TEXAS.—The Southern Car Mfg. & Supply Co., recently incorporated with $150,000 capital, will build a plant at Beaumont. J. C. Wiggs, Jr., St. Louis, Mo., and W. W. Wilson are interested.

BRIDGEPORT, CONN.—The New York, New Haven & Hartford has filed an application with the Building Commissioner for permission to build a brick freight house and offices on the east side of Main street. The main building is to be 500 x 30 ft., one-story high, the office part being two stories. The approximate cost is $50,000. Contracts will soon be let.

BUFFALO, N. Y.—The express sheds of the New York Central R. R. were destroyed by fire April 21. The loss is said to reach $200,000.

CHATTANOOGA, TENN.—Contract for remodeling the Western & Atlantic station on Market street has been let.

DANVILLE, ILL.—As previously stated the new passenger station of the Wabash will be built this spring. It will be 27 x 125 ft. with a 38 x 40 ft. wing.

CLEVELAND, OHIO.—The Cleveland Furnace Co. has been organized by Messrs. Rogers, Brown & Co., and S. W. Croxton, of Cleveland, and it will at once build a large modern blast furnace on the Cuyahoga River. The capital stock is $1,000,000. Plans have been made for two furnaces, 85 x 20 ft., with 400 tons daily capacity but only one will be built at present. Others interested are D. B. Meacham, of Cincinnati, and J. G. Battelle, of New York. The office will be in the Perry-Payne Bldg., Cleveland.

DETROIT, MICH.—It is said that Mark A. Hanna will be President of the Detroit Iron & Steel Co., which will soon be incorporated under the laws of Michigan to build a steel plant on Zug Island just below the city.

ECONOMY, PA.—It is quite probable that the United States Steel Corporation will begin work soon on its proposed new large bridge building plant at Economy, which is necessitated by the large contracts which the company has, such as the Wabash bridge at Pittsburgh, and the new bridge over the Mississippi at Gray's Point. It is stated that James Christie, Chief Engineer of the American Bridge Co., will have charge of building the new works and will be assisted by Richard Khuen, Assistant Engineer in charge of the Pittsburgh District.

EVERETT, WASH.—The Great Northern, according to report, has decided to build a new passenger station in Everett, but it is reported that the plans are not yet made.

FAIRMONT, W. VA.—An officer of the Baltimore & Ohio writes that plans have not been made for the new roundhouses to be built at Fairmont. He also says that he knows of no intention to remove the company's shops from Grafton to Fairmont, as currently reported.

FORT GETTY, S. C.—David Price, Quartermaster, will receive bids until May 14 for building a steel and iron wharf and for other work.

GREAT FALLS, MONT.—An officer of the Great Northern is reported as saying that the company will build a new passenger station in this city.

LORAIN, OHIO.—The United States Steel Corporation, it is said, is still undecided whether the large tube plant which is to be built by the company shall be located at Lorain or on Neville Island, near Pittsburgh. It is probable that the announcement will be made at an early date.

MURPHYSBORO, ILL.—W. H. Michael, formerly with the Mobile & Ohio shops at Murphysboro, is interested in a company recently organized as the Southern Illinois Foundry & Machine Co., which will establish a plant here.

MONTEREY, N. MEX.—It is said that the railroad companies entering Monterey propose to build a joint passenger station.

MOUND CITY, ILL.—Edwin J. Hall, of Jeffersonville, Ind., and E. W. Halliday, of Cairo, Ill., have organized a company that will build a ship building plant at Mound City.

NEW HAVEN, PA.—The Pittsburgh & Lake Erie is said to be getting bids on new passenger stations at Monongahela City and New Haven.

ONAWA, IOWA.—According to local reports, the Town Council has given some land to the Chicago & North Western, which company proposes to build a new passenger station in this town. An officer of the company recently told us that the plans were not made.

PERTH AMBOY, N. J.—Ground has been broken at Perth Amboy by the Standard Underground Cable Co. for its large copper wire drawing plant, which is to cost about $500,000.

PHILADELPHIA, PA.—W. A. Hurlock & Son have the contract for the six-story addition to join the Hamilton and Willow street buildings of the Baldwin Locomotive Works.

PITTSBURGH, PA.—The stockholders of the Armstrong Cork Co. have voted to add $400,000 to the capital and enlarge its plants.

QUINCY, ILL.—The Wabash will build a passenger station 50 x 60 ft. with two wings 24 x 40 ft. each.

RIVERSIDE, W. VA.—The Cumberland Cement & Mfg. Co. has made arrangements to build a large cement plant at Riverside in Mineral County.

ST. LOUIS, MO.—Contract for building the World's Fair machinery buildings has been let by Director of Works Isaac S. Taylor to Smith & Eastman, the contract price being $496,957. Many sub-contracts have been arranged for.

ST. PAUL, MINN.—Plans for the new Omaha freight station to replace the wooden structure at Broadway and Prince street have been made. The estimate is $46,000.

The St. Paul City Ry. Co. will, early in the fall, begin work on a new station at Como Park. It will cost about $35,000.

SALT LAKE CITY, UTAH.—The Oregon Short Line is to locate a new yard in North Salt Lake, where a new shop plant will also be located. We are told that it will be late in the season before work can be begun.

SANTA FE, N. MEX.—According to report, the Santa Fe Central has bought 50 acres of land on which new shops, offices, station and roundhouses will be built.

SAULT STE. MARIE, MICH.—Plans are reported made for an addition to the Algoma Iron Works machine shop.

SIOUX CITY, IOWA.—See Chicago, St. Paul, Minneapolis & Omaha in Railroad Construction column.

SCRANTON, PA.—The Lackawanna & Wyoming Valley Rapid Transit Co. has bought from the Lackawanna Iron & Steel Co. the land on which the old steel mills formerly stood. The Rapid Transit Co., it is said, intend to use this land as a terminal for its electric railroad system.

TIFFIN, OHIO.—The plant of the National Machinery Co. is said to have been sold to the National Machinery Co., of Trenton, N. J., and will be greatly enlarged. The new officers are: Lewis Selle, of Tiffin, President; H. N. Reynolds, of Dayton, Vice-President; W. Betts, Treasurer.

WALKERVILLE, ONT.—We are told that the Lake Erie & Detroit River Ry. intends to extend its car and machine shops at Walkerville.

WASHINGTON, D. C.—The Commissioners of the District of Columbia sent an additional report to the Senate Committee on the District of Columbia last week on the bill now before the Senate providing for a new Union station and terminals at Washington. The Commissioners, after a detailed analysis of the cost of the proposed work, including the station building, terminals, the abolition of grade crossings and the vacating of the Mall by the Baltimore & Potomac R. R., recommend the proposed improvement and say that in their judgment it is for the best interests of the District of Columbia that the bill should become a law.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xviii.)

American Foundrymen's Association.

The American Foundrymen's Association announces its coming convention, to be held in Boston June 17-19.

Canadian Society of Civil Engineers.

At the meeting on April 24 a paper was read by Mr. J. A. Heaman on "Description of a Dam and Accompanying Works Built for the Water Commissioners, London, Ont., at Springbank."

Railway Club of Pittsburgh.

The Railway Club of Pittsburgh will hereafter hold its meetings at the Hotel Henry. The next meeting will be held at 2 o'clock p. m., on Friday, April 25. The two subjects for discussion are: "The Locomotive," by Mr. Ira C. Hubbell, which was postponed from the previous meeting, and "Elasticity in Draft Gear," by Mr. R. A. Parke.

New York Railroad Club.

At the meeting of the club held Thursday the 17th a paper was presented by Mr. E. E. R. Tratman on "Maximum Trains; their Relation to Track Motive Power and Traffic." Mr. P. H. Dudley presented a written discussion and there was also a little verbal discussion.

The next meeting of the club will be the thirtieth anniversary of the formation of the club, and Mr. M. N. Forney will give an address being "Reminiscences of 50 Years." We need not remind the reader how interesting this address will be.

The Franklin Institute.

Some of the meetings for April and May are:

Wednesday, April 16.—Stated meeting of the Institute. "The Oil Fields of Texas," by Mr. Robert T. Hill, U. S. Geological Survey, Washington, D. C.

Wednesday, April 23.—Stated Meeting of the Physical Section. "Recent Work in Electric Convection," by Mr. J. Frank Meyer, Lower Merion High School, Ardmore, Pa.

Wednesday, May 14.—A joint meeting of the Mining and Metallurgical Section, with the American Institute of Mining Engineers. "The Micro-Structure of Rails," by Mr. Robert Job, Chemist to the Philadelphia & Reading Railway Company. "The Metallurgy of Titanium," by Mr. Auguste J. Rossi, New York.

Thursday, May 15.—Stated meeting of the Mechanical and Engineering Section.

American Railway Engineering and Maintenance-of-Way Association.

In view of the fact that opportunity for discussing each of the reports submitted at the recent convention was necessarily limited, the Board of Direction has decided to invite discussions by letter from the members, for incorporation in the proceedings. For this purpose a complete set of the reports has been mailed to each member of the Association, and it is requested that discussions by letter be prepared and forwarded to the Secretary's office not later than June 1, 1902.

The Board of Direction proposes to reorganize the different committees at an early date, and members are requested to make application for membership on the committees on which they prefer to serve, indicating the particular sub-division which they feel qualified to treat.

The Engineers' Club of Philadelphia.

A regular meeting of the club was held on Saturday, April 19, at 8 o'clock p.m. The paper was "Modern Developments in the Production of Open-Hearth Steel," Illustrated. By James Christie.

The stated meeting, April 5, was called to order by Vice-President Edwin F. Smith, at 8:20 p.m., 79 members and visitors present.

CHANGES IN THE MANUFACTURE OF PIG-IRON.

Mr. John Birkinbine presented the communication of the evening upon the above subject, and illustrated his remarks by a large series of drawings and photographs projected by the lantern. Pig-iron was first manufactured in Massachusetts in 1645, and after five other States had started this business, the first furnace in Pennsylvania was put in blast about 1720. These old furnaces were all located near water-power for operating the bellows which supplied a cold blast, and charcoal was used until 1840, when a prize was awarded to a Pottsville furnace for iron smelted with coal. The old furnaces averaged about 13 ft. bosh by 60 ft. height., with two to four tuyeres; but these figures have been increased, until, in 1901, the Warwick Furnace was built with 21 ft. bosh by 100 ft. height, with 16 tuyeres, and an output of about 200 tons per week. The speaker gave it as his opinion, however, that in these large furnaces the physical resistance of the material has probably been exceeded, although the methods of smelting have been so much improved that to-day about eight times as much iron is made with fewer furnaces in blast than 30 years ago. The progressive methods of mining the iron-ore, with data as to amounts, were also described and illustrated. A discussion followed, which was participated in by Messrs. Charles Hewitt, James Christie and Edwin F. Smith.

Iron and Steel Institute (British).

The Annual Meeting of the Institute will be held at the Institution of Civil Engineers, Great Gorge street, Westminster, on Wednesday and Thursday, the 7th and 8th of May, 1902, commencing each day at 10.30 o'clock a.m. The programme of proceedings includes the presentation of the Bessemer Gold Medal for 1902 to His Excellency F. A. Krupp, of Essen, and the annual dinner of the Institute in the Grand Hall of the Hotel Cecil. The following is a list of the papers that are expected to be submitted:

1. Report by the Committee appointed to investigate the Nomenclature of Metallography.
2. "On a New Vacuum Tuyere for Blast Furnaces," by Horace Allen, London.
3. "On the Microstructure of Hardened Steel," by Professor J. O. Arnold and A. McWilliam, Sheffield.
4. "On the Compression of Fuel before Coking," by J. H. Darby, Brymbo.
5. "On Gas from Wood for use in the Manufacture of Steel," by James Douglas, LL.D., New York.
6. "On a combined Blast-Furnace and Open-Hearth Process," by P. Eyermann, Benrath, near Düsseldorf.
7. "On the Physical and Chemical properties of Carbon in the hearth of the Blast-Furnace," by W. J. Foster, Darlaston.
8. "On the Sulphur contents of Slags and other Metallurgical Products.", by Baron H. Von Jütner, Donawitz, Austria.
9. "On the Elimination of Silicon in the Acid Open-Hearth Furnace," by A. McWilliam, Sheffield, and W. H. Hatfield, Sheffield.
10. "Report on Research Work carried out during the past year," by J. A. Mathews, Ph.D., New York (Andrew Carnegie Research Scholar).
11. "On the Iron Ore of Brazil," by H. Kilburn Scott, Rio de Janeiro.
12. "On the Recovery of By-products in Coking," by J. Thiry, London.
13. "On Brinell's researches on the influence of Chemical composition on the soundness of Steel Ingots," by Axel Wahlberg, Stockholm.

American Society of Civil Engineers.

The Thirty-fourth Annual Convention, in the 50th year of the life of the Society, will be held at Washington, D. C., May 20th, 21st, 22d and 23d, 1902. The Committee of Arrangements of the Board of Direction is: Mordecai T. Endicott, Chairman; George H. Pegram, Chas. Warren Hunt. The Local Committee is: George W. Melville, Chairman; John Biddle, William M. Black, D. S. Carll, Bernard R. Green, C. B. Hunt, D. E. McComb, Alexander Mackenzie, Alexander M. Miller, H. M. Wilson. The headquarters of the Society, Secretary's office, meeting room, etc., will be at the Willard Hotel.

All the meetings will be held in the banquet hall on the top floor of the New Willard Hotel.

The first meeting will be on the morning of Tuesday, May 20th, and will include addresses of welcome, and the presentation of the annual address by the President of the Society. At a meeting which will be held Tuesday evening, illustrated talks, descriptive of engineering work in the District, will be given as follows: William M. Black, M. Am. Soc. C. E., on District Government; D. E. McComb, M. Am. Soc. C. E., on Sewers; Colonel Merrill, on Water Supply; Bernard R. Green, M. Am. Soc. C. E., on Washington Monument and Library Building; D. S. Carll, M. Am. Soc. C. E., on Electric Railway System; Charles Moore, Esq., on Proposed Park Improvements.

One of the other meetings will be a business session, as required by the Constitution, at which committee reports will be received and other business transacted.

Meetings will also be arranged for professional discussion, and it is hoped that members will take an active interest in presenting their views on the topics selected, the rule being that no speaker shall occupy more than 10 minutes.

The following topics for informal discussion have been selected by the Publication Committee. These will be taken up in the order given, at meetings to be stated in the programme, which will be ready for distribution at the convention.

Topic No. 1.—"In contract work, either public or private, is it preferable to make separate contracts for the different branches of trades involved, or to combine all under one general contract?"

Topic No. 2.—"Is it possible and desirable to keep accounts of work in progress in such a manner as to ascertain unit costs on each class of work?"

Topic No. 3.—"Is steel susceptible of being made as permanent a building material as masonry?"

Topic No. 4.—"In view of the numerous disasters caused by the contracting of channels, or the damming of small streams, should non-navigable streams be under the control of the National Government?"

Topic No. 5.—"Should the National Government undertake the construction and operation of irrigation works?"

Topic No. 6.—"Should Engineering Practice be regulated by a code of ethics? If so, how can such a code be established?"

Apart from these meetings, the Local Committee has arranged for several excursions and other entertainments: The Society will be received by the President of the United States; an excursion to Cabin John Bridge; an excursion to the Navy Yard and gun factory, with an inspection of the interesting towing tank and apparatus for testing ship models; an excursion to Washington Barracks on the old Arsenal grounds, where an exhibition of Pontoon bridge-building will be given; an all-day excursion by steamer to Fort Washington, where gun-firing on disappearing carriage, etc., will be witnessed, thence to Marshall Hall, opposite Mt. Vernon, where a planked-shad dinner will be served; Mt. Vernon also will be visited. Time has been reserved so that special parties may be made up to visit the points of engineering and general interest described on the first evening, under the guidance of engineers residing in the District, and in charge of the various works. Notice of the starting of each of these expeditions will be given at the first meeting. One afternoon will be specially reserved for this, but such guidance will be ready on all days to escort parties who desire to visit such points of general interest as the Washington Monument, National Museum, Capitol, Congressional Library, War Department, Geological Survey, Soldiers' Home, Arlington National Cemetery, etc. Although it cannot be definitely announced, it is probable that on one of the evenings a reception will be held in the Corcoran Gallery of Art.

Engineers' Club of St. Louis.

A regular meeting was held at the rooms of the club at 8 p.m. April 2, President Kinealy in the chair.

The resignation of Mr. G. I. Bouton as Treasurer was presented, and Mr. Wall was elected to the office. The Secretary read an invitation from the Missouri Historical Society to the members of the Engineers' Club for the loan exhibition at the society's rooms. The St. Louis Architectural Club invited the members to their third annual exhibition at the Museum of Fine Arts.

The matter of the amendments to the by-laws was taken up by the club and discussed at some length. As no single set of amendments were satisfactory to the club, it was ordered that the matter be referred to a special committee consisting of those who had drawn up the amendments submitted, viz.: Messrs. Russell, Flad, Colby, Wall, R. H. Phillips and G. I. Bouton, and report at the next meeting a new set of amendments. The special committee was instructed to include in the amendments to be submitted by them:

1. The feature of a nominating committee.
2. Provision that no member can serve on the nominating committee more than once in two years.
3. That the nominating committee shall submit but one candidate for each office.
4. A plurality of votes cast shall be sufficient to elect.

TEXAS OIL.

The President then introduced Mr. H. H. Humphrey, who read a paper entitled, "Notes on the Use of Beaumont Oil as Fuel." The oil district is only a few hundred acres in extent and the wells are thickly crowded. The capacity of the wells range from 10,000 to 80,000 bbls. per day, and the pressure does not seem to be affected by additional wells. If all the wells were allowed to flow at once and the pressure was not diminished, the total flow would be seven million bbls. per day. While the oil is of great importance to the Southwest, where coal is scarce and of inferior quality, its use in more remote districts appears to be limited by transportation rates and facilities. The price at St. Louis was recently quoted at $1.14 per bbl., of which 9 cents was for the oil and $1.05 for the freight. The oil is a smokeless fuel when properly burned. The steam jets used in connection with the burners consume from 3 per cent. to 13 per cent. of the total steam generated. The present insurance rules require a minimum distance of 50 ft. between an underground tank and the nearest building. Its use in cities would therefore require considerable expense for storage space. In one plant in Texas for which estimates were made it required oil valued at $1.39 to equal a ton of coal at $2.50. At St. Louis the price will have to be reduced to about 60 cents per barrel in order to compete with coal. Some bids were received for the oil burning equipment of two 100-h.p. boilers. The prices ranged from $704 to $1,525. The price of oil, f. o. b. Dallas, ranged from 45 cents to 50 cents per bbl. on a year's contract, and the price increased with the length of term of the contract. The best tests show an evaporation of about 15 lbs. of water to one of oil. The cost of the average well as reported by a competent authority to the Bureau of Statistics at Washington, D. C., was about $12,000. The paper was discussed by Messrs. Flad, Bausch, Perkins, Johnson and others.

The 543d meeting was held April 16, 1902, President Kinealy in the chair. Present, 33 members, 6 visitors. Mr. R. H. Klauder presented a paper entitled, "Present American Storage Battery Practice." While America was not first in the adoption of the electrical accumulator it has surpassed European countries in successful methods of its application. Fundamentally the necessity for the use of a storage battery depends on the fact that the loads on generating stations vary, resulting in requiring investment in machinery which may have the opportunity, during only a short portion of its life, of earning a return. The variation in the load also results in low economy. The ideal condition for a station would be to have generating machinery run through the entire 24 hours at a uniform load. This is not possible, as a battery large enough for this costs more than the saving to be obtained from it. All that it is practicable to do, therefore, is to install a battery large enough to take care of the sharpest part of the peak and to carry the entire load during minimum hours. In railroad work a storage battery may be applied either as an auxiliary to the generating machinery or the distributing system. In the generating stations it increases the economy of the engines, reduces the depreciation and repairs on the machinery and increases the capacity of the station. When applied to a direct current feeder it increases its capacity, reduces the loss in the copper, reduces the fixed charges per kilowatt hour delivered and maintains the pressure. In rotary sub-stations the equipment, including batteries, costs no more than that without them and is much more economical. In isolated plants a battery permits electric elevators to be supplied from the same generators as furnish light besides giving current at all hours of the 24 without the necessity of running the machinery. The paper was illustrated by a number of lantern slides showing completed installations and curves showing the results obtained by the use of batteries. The paper was discussed by Messrs. Reber, Zeller, Langsdorf, Roper and others.

PERSONAL.

—Mr. Charles Hansel has been elected Vice-President and General Manager of the Pneumatic Signal Company and after May 1, will be located in its new office, Broad Exchange Building, New York city.

—Mr. W. E. Symons has resigned the position of Superintendent of Motive Power and Equipment of the Plant System of Railways. He will sail for France in the first week of May, and will spend considerable time on the Continent and in England studying locomotive progress, with special attention to the four-cylinder balanced compound principle.

—Mr. P. S. Eustis, Passenger Traffic Manager of the Chicago, Burlington & Quincy, in charge of the Burlington lines, went to the Burlington & Missouri River in 1876 as a clerk and filled various clerkships until 1881, when he was made General Passenger Agent and remained in that position until 1888, when he was made General Passenger Agent of the Chicago, Burlington & Quincy. Mr. Eustis assumed his new duties, as stated above, April 8 of this year.

—Mr. A. J. Cota, Master Mechanic of the Chicago Terminals of the Chicago, Burlington & Quincy, commenced his railroad service with this company immediately after leaving school in the shops at Aurora, Ill., and after working at various jobs in the roundhouses for several months he was promoted to be locomotive fireman. After several years' service in that position he became engineman, which position he held until 1885, when he was appointed air-brake instructor of the Burlington System and remained there until 1901, when he became Division Master Mechanic of the St. Louis Division. It was from the last-named position that Mr. Cota was promoted to his present position.

—Mr. Howard Elliott, Second Vice-President of the Chicago, Burlington & Quincy, in charge of the operation of the whole system, was born in New York city in 1860. His career dates from 1880, when he began as a level rodman on the Burlington. For one year he was out of railroad service. In 1882 he was appointed Auditor and Assistant Treasurer of the Chicago, Burlington & Kansas City and the St. Louis, Keokuk & Northwestern. From 1887 to 1891 he was General Freight and Passenger Agent, and in 1891 he assumed the added duties of General Freight Agent of the Hannibal & St. Joseph and the Kansas City, St. Joseph & Council Bluffs. Mr. Elliott was appointed to the position from which he was promoted, that of General Manager of the same roads, in 1896.

—The new Resident Engineer of the Texas Central, Mr. W. C. Beach, was born at Kemptville, Canada, in 1864. He was educated at the Albert College, Belleville, Ont., and the School of Science at Toronto. In 1885 he entered the service of the Atchison, Topeka & Santa Fe as a rodman. This position he held for two years, at the end of which time he resigned to go with another company. In 1888 he returned to the Santa Fe as Division Engineer of Maintenance of Way, but remained there only a few months, leaving to become Assistant Engineer of the Arizona & Southeastern. For two years he was Division Engineer for the Gulf, Colorado & Santa Fe at Galveston, Texas, and in 1891 he became Chief Engineer and Superintendent of the Texas, Louisiana & Eastern, and from 1897 until his recent appointment, as Resident Engineer of the Texas Central, Mr. Beach was Assistant Engineer of the Gulf, Colorado & Santa Fe.

—Mr. Charles M. Levey, the new General Manager of the Hannibal & St. Joseph, has been with the Burlington for 30 years, having been identified with this company from early boyhood. He was born in 1858 in Huron County, Ohio. At the age of 14 he started his railroad service as an office boy on the Michigan Central and the following year went to Red Oak as operator, later becoming a clerk. In the fall of 1875 he was made chief clerk, and five years later, was transferred from Burlington to Chicago as Superintendent of Telegraph and Private Secretary to Mr. T. J. Potter, who was then General Manager. In November, 1880, Mr. Levey returned to Burlington as Assistant Superintendent of the Iowa Lines and two years later went to Keokuk as Assistant General Superintendent of the St. Louis, Keokuk & Northwestern and the Chicago, Burlington & Kansas City and served in this capacity until 1887, when he was made general Superintendent.

—At the regular meeting of the Executive Committee of the St. Louis Railway Club, held on Friday, April 11, the President was directed to appoint a committee to draw up resolutions expressing the sentiment of the St. Louis Railway Club on the recent promotions of two well-known St. Louis railroad officials. Following is the report of that committee:

"Whereas, Untiring efforts and fidelity of purpose have recently been rewarded in the elevation of Mr. W. G. Besler to the position of General Manager of the Central Railroad of New Jersey, and of Mr. W. A. Garrett to the position of General Superintendent of the Philadelphia & Reading R. R.; and,

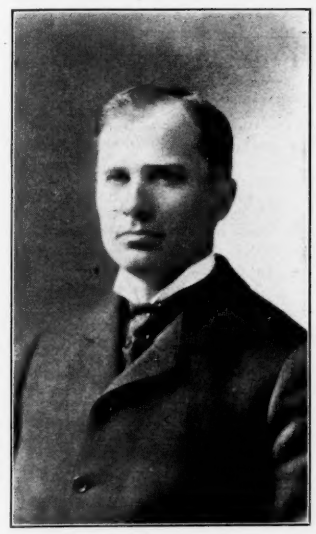
"Whereas, Recognizing the fitness of such promotions and remembering with gratification the excellent work performed by those gentlemen as members and officers of the club from its organization; it is

"Resolved, That the executive committee of the St. Louis Railway Club, for themselves and the club as a whole, are much pleased at the merited advancement of the two gentlemen, and wish for them continued success and happiness in the positions they are destined to fill."

—General Egbert L. Vielé died, April 22, in his 77th year, at his home in New York. He attended, on Monday evening, a dinner of Co. K of the Seventh Regiment, which was an engineer company in the Civil War, when he was its captain. Indigestion and heart disease were given as the causes of his death. Egbert Ludovickus Vielé was born at Waterford, N. Y., June 17, 1825. He was graduated in 1847 from the United States Military Academy at West Point, N. Y., and served with distinction in the Mexican War. He resigned from the army in 1853 and went to New York. He was from 1854 to 1856 State Engineer for New Jersey. Subsequently he was appointed Chief Engineer of Central Park. He was selected in 1860 to prepare plans for Prospect Park, Brooklyn. Interrupted in this work by

the outbreak of the Civil War, he enlisted. He became a captain in the Seventh Regiment and in 1861 he was commissioned Brigadier-General of Volunteers. General Vielé became a Park Commissioner in 1883 and in 1884 he was made President of the Board. He served as a Representative in Congress from 1885 to 1887. He was, in 1896, invited by the British House of Lords to address them on the subject of municipal improvements in the United States and he delivered the closing address at The Hague Congress in 1898, as a member of the International Congress on History. General Vielé was the author of "A Handbook for Active Service" and "A Topographical Atlas of New York City," and other works.

—As stated last week (page 295), Mr. Daniel Willard was elected Third Vice-President of the Erie Railroad.



Mr. Willard began railroading in 1879, in the track department of the Vermont Central. He is a native of Vermont, having been born at North Hartland in 1861, and was graduated from the Windsor High School in 1878. In July, 1879, he went with the Passumpsic road and continued with this company until 1883 as fireman and engineman. He resigned from this position to become locomotive engineer on the Lake Shore & Michigan Southern and still later assumed the same duties on the Minneapolis, St. Paul & Sault Ste. Marie. He was then promoted to Trainmaster and Superintendent, and in 1899 was appointed Assistant General Manager of the Baltimore & Ohio. In May last (1901) Mr. Willard was appointed Assistant to the President of the Erie and discharged these duties until his recent election as Third Vice-President. As Third Vice-President Mr. Willard will have direct charge of the operating department.

—Mr. Archibald A. McLeod died at his home in New York City at 4 o'clock on the afternoon of April 19. His death was the result of appendicitis which was relieved by an operation some weeks ago, but he was left with an affection of the heart. He was a Canadian by birth, from the Province of Quebec, where he was born in 1846. While still a lad he came to the United States and in 1869 he was a clerk in the bank of Geo. B. Sargent at Duluth. Austin Corbin succeeded Sargent in 1871 as the representative of Jay Cooke and thus came to know McLeod, and in course of time made him the Manager of the Elmira, Cortland & Northern Railroad. This gave McLeod responsible experience and brought him into notice, and in 1886, when Mr. Corbin became President of the Philadelphia & Reading, he made Mr. McLeod General Manager of that company, of which he soon became Vice-President and a Director. In 1890 Mr. McLeod succeeded Mr. Corbin as President, being then 44 years old. Here he shortly distinguished himself by colossal and sweeping plans which involved the consolidation in one control and interest of the Central Railroad of New Jersey, the Lehigh Valley, the Poughkeepsie Bridge, the New York & New England and the Boston & Maine. It is not worth while to go now into the particulars of the vast schemes which were formed and partially carried out, they were so recent and so conspicuous that our readers must remember them pretty well, and also the results. The Reading went into the hands of Receivers and in 1893 Mr. McLeod resigned from the Presidency and also from the Receivership, and since that time he has not been very conspicuous, although he has been active in speculation in New York City and has been connected in one capacity or another with several concerns, as for instance, at one time he was President of the Compressed Air Company. Mr. McLeod was a good example of a man of great gifts whose usefulness and success in the world were impaired by a defective moral vision. This is not to say that he broke any one of the ten commandments; but he was a man of an essentially low conception of that which is worth getting and of the way of getting it. Keeping well in mind the ancient saying, "de mortuis nil nisi bonum," still it is no more than our duty to say at least what we have said about the reasons for Mr. McLeod's failure in life; for after all his life was a failure in the large sense. Yet he was a man of fertile imagination, bold and resourceful, quick and acute and possessing the further advantage of uncommon personal beauty. Bodily he was built almost on Greek lines and he was not insensible of the advantages of his personal appearance. In spite of his gifts and great opportunities he died leaving behind him a reputation clouded by the distrust of his contemporaries.

ELECTIONS AND APPOINTMENTS.

Arkansas & Choctaw.—At a meeting of the Board of Directors, held April 7, the following officers were elected: John Scullin, President; R. H. Keith, Vice-President, and Charles Gilbert, Secretary and Treasurer. Allen McCarty has been appointed Auditor.

Chicago & North Western.—S. M. Braden has been appointed Superintendent of the Galena Division, with headquarters at Chicago, Ill., succeeding W. E. Morse, resigned. W. M. Wells has been appointed Assistant Superintendent of the same Division, succeeding W. D. Beck, who becomes Assistant Superintendent of the Iowa Division, with headquarters at Boone, Iowa, succeeding E. G. Schevenell, who in turn succeeds Mr. Braden as Superintendent of the Iowa and Minnesota Division at Mason City, Iowa, and E. A. Kellogg succeeds Mr. Wells as Superintendent of Dining and Parlor Cars.

Chicago Great Western.—J. Birse has been appointed Division Master Mechanic, with headquarters at St. Paul, succeeding H. T. Herr, resigned, and Morris Daley has been appointed Division Master Mechanic at Des Moines, Iowa, succeeding Mr. Birse.

Cincinnati, Richmond & Muncie.—Fred E. Signer has been appointed General Freight and Passenger Agent, with headquarters at Richmond, Ind.

Hannibal & St. Joseph.—C. M. Levey, heretofore Superintendent of the Iowa Lines of the Chicago, Burlington & Quincy, has been appointed General Manager of the H. & St. J., succeeding H. Elliott, effective May 1.

Kansas City Southern.—John Lahey, heretofore Division Foreman, has been appointed Division Master Mechanic, with headquarters at Shreveport, La., succeeding J. M. Scrogin.

Maine Central.—A. A. White, Division Superintendent at Bangor, Me., has resigned.

Mexican National.—J. N. Galbraith has been appointed Assistant General Manager, with headquarters in the City of Mexico, succeeding B. F. Dickson, resigned. J. S. Capers becomes Acting Superintendent of the Northern Division. (See Texas-Mexican).

Missouri Pacific.—R. H. Elliott has been appointed Chief Engineer with headquarters at St. Louis, Mo.

New York Central & Hudson River.—Howard H. Lincoln has been appointed Supervisor of Track, with headquarters at Syracuse, N. Y., succeeding D. E. Dale, deceased.

Northern Alabama.—C. H. Ackert has been appointed General Manager, succeeding F. S. Gannon, resigned, effective April 21.

Northern Pacific.—Andrew Gibson has been appointed Superintendent of the Yellowstone Division, with headquarters at Glendive, Mont., succeeding Newman Kline, transferred, effective May 1.

Pittsburgh, Shawmut & Northern.—D. F. Maroney, heretofore General Superintendent of the Baltimore & Ohio, has been elected Vice-President of the P., S. & N.

Plant System.—The statement that F. L. Pickering (page 295) was appointed General Passenger Agent is incorrect. Mr. Pickering has been made Traveling Passenger Agent at Tampa, Fla.

Salt Lake & Los Angeles.—J. E. Langford has been appointed Manager, with headquarters at Salt Lake City, Utah.

San Pedro, Los Angeles & Salt Lake.—See Railroad Construction column.

Savannah Union Station.—R. G. Matthews, heretofore Trainmaster of the Plant System, has been appointed Superintendent of the S. U. S., with headquarters at Savannah, Ga.

Southern Pacific.—Owing to ill health F. E. Prior, Division Superintendent (Pacific System), has been granted an indefinite leave of absence.

Tennessee Central.—W. A. Beatty, General Freight and Passenger Agent, has resigned.

Texas-Mexican—J. S. Capers has been appointed General Superintendent, succeeding J. N. Galbraith, resigned. (See Mexican National.)

Union Pacific.—Henry C. Ferris has been appointed Assistant Superintendent, with headquarters at Omaha, Neb., succeeding Charles B. Keyes, assigned to other duties.

Virginia & Southwestern.—F. R. Barrett, Engineer of Maintenance of Way, with headquarters at Bristol, Tenn., has resigned.

White Pass & Yukon.—P. F. Scharschmidt has been appointed Superintendent of the River Division.

Wiggins Ferry.—R. H. Johnson has been appointed Superintendent, with headquarters at St. Louis, Mo.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALABAMA ROADS.—Work is reported begun by McCall & Co., contractors, on a new line 18 miles long from Bridgeport, Ala., up Doran's Cove to the Needmore coal mines in Jackson County.

ATLANTIC & BIRMINGHAM.—Contract for the 18-mile link between Montezuma and Byronville, Ga., has been let to W. Z. Williams. This is a portion of the 30-mile stretch between Cordele and Oglethorpe on the way to Birmingham.

BELLINGHAM BAY & BRITISH COLUMBIA.—An officer writes that 38 miles of road are now completed, extending east from Whatcom, Wash. Surveys have been made from the present terminus at Maple Falls to the Methow River in the eastern part of Washington. The work to be done this year will consist of an extension about 15 miles east from Maple Falls; the development of 10,000 h.-p. at the falls of the Nooksack, and the making of definite location and extension of the preliminary survey with one full survey party. This location work is in charge of J. J. Cryderman, and the contract for the extension has been let to W. G. Warner. This line will probably have 2 per cent. grade as a maximum, with 10 deg. curves, and there will be some heavy side hill work. There will be one and possibly two river crossings, each of which will require a 200-ft. span, with approaches of pile trestle. Rails will be purchased through the San Francisco office. J. J. Donovan, Whatcom, Wash., is General Superintendent.

The company does not intend to increase its equipment except as it builds, for the present. Thirty 60,000-lb. flat cars are now being built and 20 were completed last year.

BELLINGHAM BAY & EASTERN.—Surveys are reported for a spur line to run from Hart, Wash., about eight miles southeast into timber lands. Three miles have already been built.

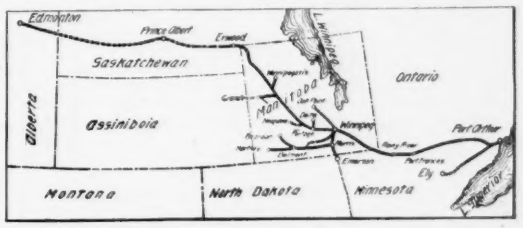
BESSEMER & LAKE ERIE.—The nine-mile cut-off from Kremis to Osgood, Pa., is now completed as far as track laying is concerned and it will be opened for passenger business some time this month.

BIRMINGHAM & STEEL CITY RAILWAY & POWER.—A consolidation of the Steel Cities Co. and the Warrior River Power Co., of Birmingham, Ala., was effected April 9, with $2,000,000 authorized capital stock. It is proposed to operate an electric road 40 miles long from Birmingham to Ensley, Wylam, Woodward and Bessemer, Ala., and also from Ensley to Pratt City, Brookside and Adamsville, all being suburbs of Birmingham. Franchises have been secured and building is to begin at once.

BIRMINGHAM, SELMA & NEW ORLEANS.—Work on the first section of the extension from Thomaston, Ala., to Myrtlewood, 17 miles, is reported completed as far as Linden, 11 miles, and grading is reported in progress for the remainder. Contract for this was let last August. (Construction Supplement, March 14, 1902.)

BUTLER COUNTY STREET.—This company was incorporated in New York, April 17, to build an electric road from a point in New Castle Borough, Lawrence County, Pa., to a point in the Borough of Tarentum, Allegheny County, Pa., a distance of 50 miles. A. L. Reiber, of Butler, Pa., is President.

CANADIAN NORTHERN.—The accompanying illustration, from a map recently published by the company, shows the existing mileage and also the proposed lines on which work is now under way. These, indicated by dotted lines, will be seen to be five in number, the most important being the long line across Saskatchewan into Alberta. The proposed line to Bute Inlet, on the Pacific, will, if it is built, connect with this line.



CANASTOTA & MORRISVILLE (ELECTRIC).—The New York Railroad Commissioners have approved a $300,000 mortgage and the increase of capital stock from $200,000 to $300,000, to provide for building this proposed electric line, which is to run between the points named in Madison County and will be 15 miles long. L. W. Burrows, of Morrisville, and N. H. Patten, of Canastota, are directors.

CHARLOTTE, FARMVILLE & JAMES RIVER VALLEY.—This company has secured an amended bill of an act originally approved, Jan. 26, 1900, for the proposed line between Charlotte and Farmville, Va., a distance of about 25 miles. By the amendment the company is required to commence work within two years from the first day of March, 1902, and complete the main line within five years.

CHARLOTTE, MONROE & COLUMBIA.—An officer writes that 12 miles of this new line which is to run between Monroe, N. C., and McBee, S. C., a distance of 40 miles, is now in operation, and that contracts for another 10-mile section will be let during the next 30 days. The road passes through a sandy country, with no bridges of any consequence and 1¼ per cent. average grade. It is designed to afford a short route in connection with the Seaboard Air Line between Charlotte and Columbia. Ernest Williams, Lynchburg, Va., is President; J. H. Diggs, McBee, S. C., is Vice-President and General Manager; R. T. Yates, Lynchburg, Va., is Secretary and Treasurer, and J. A. Duncan is Superintendent.

CHARTIERS VALLEY & EASTERN.—A steam railroad from a point in Chartiers Township, Washington County, to a point in Mt. Pleasant Township, same county, five miles, was provided for by incorporation of the above, April 16. John M. Kennedy, of Parnassus, Pa., is President.

CHATEAUGAY.—An officer writes in regard to the report that the line was to be changed to broad gage (April 4, p. 257), that the company has the project under consideration, but has not as yet decided when work will be begun.

CHESAPEAKE & OHIO.—Charter has been granted in Virginia for a company in the interest of the above, to be known as the Big Sandy, which is authorized to build from the State boundary between Kentucky and Virginia into Buckannon and Dickenson Counties, Va. It is thought that a similar company will be incorporated to build connecting lines in Kentucky.

CHICAGO & EASTERN ILLINOIS.—An officer writes in reference to the report that a cut-off is to be built between the Terre Haute Division and the Brazil Division, at a point just north of the Brazil district coal mines in Indiana, that preliminary lines have been run but that nothing has been settled, and the present indications are that no work will be done this season. (April 11, p. 277.)

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Contracts for the new terminals on the land recently purchased in Sioux City, Iowa, will be let within a few days. Bids have been asked for the following: Grading, 180,000 cu. yds. fill; piling, 3,025 ft. piles; machine shop, 240 x 120 ft.; boiler shop, 80 x 248 ft.; store house, 60 x 150 ft.; power house, 90 x 60 ft.; transfer pit, 35 x 270 ft.; 15-stall roundhouse and the laying of eight tracks, with switches, for a distance of two miles. The contracts for grading will be let at once and the work started as soon as possible. The machine shops, boiler house and power house will be built of brick and stone on piling foundations. (Jan. 17, p. 49.)

COLUMBIA RIVER & NORTHERN.—Surveys are reported for a line about 45 miles long between Goldendale and Lyle, Wash., along the Klickitat River. It is thought that work will be commenced in May. H. C. Campbell, Portland, Ore., is General Manager.

CONNOQUENESSING STREET.—This company was incorporated in Pennsylvania, April 17, to build an electric road from a point in the Borough of Butler, Pa., to a point in the Borough of Etna, Allegheny County, a distance of 25 miles. A. L. Reiber, of Butler, Pa., is President.

DARIEN & WESTERN.—It is said that this railroad, now in operation between Darien and Crescent, Ga., 11 miles, will be extended to Walthourville and Vidalia, on the Seaboard Air Line, a distance of about 55 miles. John S. Lane at Darien, Ga., may be addressed.

DENVER & RIO GRANDE.—The firm of Deal Bros. & Mendenhall, of Springville, Colo., have received the contract for what is to be known as the North Fork Branch of this road. It has been recently located and will extend from Delta, Colo., to Paonia and coal fields near. Paonia is 45 miles from Delta. The route will follow the north fork of the Gunnison River and work is to be started at once at the Delta end. (March 21, p. 217.)

DENVER & SALT LAKE RY., TUNNEL & MINING.—The proposed route of this line, incorporated last July to connect the cities named, will follow from Denver to the tunnel, the old surveys of the Denver, Lakewood & Golden Company through Idaho Springs. The tunnel is situated 1½ miles above Graymont. This was included in the former project but over two miles remain to be built. From this point on the route follows the Snake River for some little distance. The valleys of the Grand, Bear and Green Rivers are also followed on the way to Salt Lake. No work has as yet been done. The directors of the company are E. C. Beebe and J. E. Ratchford, of Syracuse, N. Y., and others.

DENISON, BONHAM & NEW ORLEANS.—It is said that this line, which has recently been completed from Denison, Texas, 30 miles southeast to Bonham, is to be at once extended to Beaumont, a distance of more than 200 miles. The completed portion on the road is now operated by the Missouri, Kansas & Texas, which is thought

to be behind the proposed extension. Edward Steger is President.

GEORGIA ROADS.—The Perkins Lumber Co., which already operates one line in the eastern part of the State, is reported building a railroad from Bostick to Montezuma, 36 miles, to open up new timber in Talbot and Marion Counties.

GOODLETTSVILLE & GREENBRIER.—Application was made in Tennessee April 16 for a new railroad to run from a point one mile north of Goodlettsville, to a point near Greenbrier, on the Hendersonville Division of the Louisville & Nashville, a distance of seven miles. The line is in the interest of the Louisville & Nashville to remove certain heavy grades, and the incorporators are Major James Geddes, J. H. Ellis, Secretary of the Louisville & Nashville, and others.

GREAT NORTHERN.—New terminals are to be built at Seattle, Wash., for the Seattle & Montana, which is an allied company to the above. The work involves a tunnel over half a mile long and the total amount to be spent is about $1,500,000. It is reported that it was recently voted to increase the capital stock from $12,500,000 to $14,000,000 to meet these.

HECLA BELT.—This railroad has been incorporated under the laws of the State of Michigan for the purpose of building a line about 20 miles long in Bay County. The incorporators are J. Stroh, T. D. Buhl and others.

HOUSTON, BEAUMONT & NEW ORLEANS.—Surveys are reported for a line from Houston to New Orleans by way of Beaumont, Lake Charles, Gueydan and New Iberia. The last portion of this proposed route, if built, would parallel the new line which is being built by the Southern Pacific. At present there is considerable need for a railroad in that locality on account of the production there of rice and lumber. It is thought that work will begin on this line by the first of June.

IMPERIAL & GULF.—Contract for grading this new line in California has been let to Geo. A. Carter, of Pomona, for a stretch 30 miles long between Old Beach, on the Southern Pacific, and Imperial. Work was to have been begun April 10. (April 11, p. 277.)

INDIANAPOLIS NORTHERN TRACTION.—Articles of incorporation were filed April 15 by this company, which is a consolidation of a number of electric interests in various cities north of Indianapolis, Ind. It is proposed to build from Indianapolis to Logansport, through Tipton, Kokomo and Peru, with a number of branch lines. Securities have been underwritten by an eastern syndicate through President Geo. F. McCulloch, of the Union Traction Co. The directors are Chas. A. Baldwin, Henry Moore and others.

INTERNATIONAL & GREAT NORTHERN.—An offer has been made to purchase the 14 miles of railroad owned by the State of Texas, running between Rusk and a point on the Neches River, for $22,000. If the offer is accepted, it is planned to extend this section west to Palestine, a further distance of 15 miles.

LAKE ERIE & DETROIT RIVER.—It is said that a short spur line is to be built at St. Thomas, Ont., to reach factory properties.

LAUREL & BROOKEVILLE (ELECTRIC).—It is proposed to build an electric line between Laurel and Brookeville, Md., a distance of 13 miles. The above company was incorporated April 11 under the laws of Maryland by Asa M. Stabler and F. P. Thomas, of Sandy Spring, Md. No officers have as yet been elected.

LAUREL HILL.—It is proposed to build a steam railroad 39 miles long from a point near the Borough of Bolivar to Mt. Pleasant, Westmoreland County, Pa. The above company was incorporated April 16, and J. M. Milliken, of Allegheny, Pa., is President.

LEHIGH & NEW ENGLAND.—Contract is reported let to the Keystone Construction Co., of Easton, Pa., for an extension of the line from Tatamy to the Delaware River, five miles long. It is proposed, according to the report, to bridge the Delaware near Easton and form a junction at Phillipsburg, N. J., with the Pennsylvania.

LEXINGTON & EASTERN.—Bids are being received by this company for ballast tracking which will extend for about 50 miles and for which the estimated cost is $60,000 or more.

LOUISVILLE & NASHVILLE.—Grading on the proposed extension of the Alabama & Florida line from Geneva, Ala., southeast 45 miles to Marianna, is reported completed as far as Graceville, 23 miles, and track laid for about one-third of the distance. It is expected that this Graceville section will be in operation July 1.

MAINE CENTRAL.—It is the intention of the company to re-lay the present roadbed with heavier rails during the present season between Leeds Junction and Farmington, Me., and from Leeds Junction to Waterville, a distance of about 37 miles each way. The work is to be done by the company's own forces.

MEMPHIS, HELENA & LOUISIANA.—Rights of way are reported being secured for one of the lines included in the projects of this company which was incorporated last November by officers of the Missouri Pacific. It is proposed to begin building some time this spring between Latour and Trippe, Ark., a distance of about 80 miles.

MEXICAN NATIONAL.—The opening of the Texas-Mexican line as a standard gage road between Laredo, Texas, and Corpus Christi, has been set for May 10. It is announced also that the Monterey Division of the system will be completed as standard gage during September. (Dec. 6, p. 850.)

MEXICO ROADS.—Surveys are reported in the interest of the Mexican Anthracite Coal Co. for a railroad from Moreno, on the Sonora Branch of the Southern Pacific in the State of Sonora, Mexico, to the coal mines of the company about 80 miles distant. General Chas. P. Eagan is at the head of the company.

MICHIGAN ROADS.—Surveys are reported for a new electric line from Muskegon to Manistee by way of Whitehall, Shelby, Hart and Scottville.

MISSOURI, KANSAS & TEXAS.—Preliminary surveys are reported for a cut-off from a point on the main line either at Taylor Station or Granger, Texas, south through Austin to San Marcos, a distance of about 75 miles. It is said that this line will be begun this summer.

MOBILE, JACKSON & KANSAS CITY.—Surveys are reported completed from Augusta, Miss., to a point 25 miles north of Newton, on the proposed extension from Augusta to the junction of the Alabama & Vicksburg, 96 miles. (Jan. 31, p. 86.)

NEW YORK, ONTARIO & WESTERN.—An officer writes in regard to the projected double-tracking of the line between Cadosia, N. Y., and Cornwall, N. Y., that it is not known definitely yet whether or not contracts will be let. An inspection of the line is to be made next week, with a view to commencing work. (April 18, p. 296.)

NIAGARA, ST. CATHARINES & TORONTO (ELECTRIC).—It is said that contracts are to be let at once for the extension of this electric line in Ontario to Hamilton, 33 miles distant. It is at present in operation between St. Catharines and Niagara Falls, 12 miles.

OREGON & SOUTHWESTERN.—This company was incorporated April 20, in New Jersey, with a capital of $1,000,000, for the purpose of building railroad lines in Oregon. No details as to the purpose or the plans of the company are at the present time available.

PENN HAVEN JUNCTION & GLEN ONOKO.—Incorporation was granted, April 22, to a company proposing to build a steam railroad from Penn Haven Junction, Carbon County, Pa., to Glen Onoko, in the same county, a distance of 5½ miles. Alfred Walter, of South Bethlehem, Pa., is President.

PENNSYLVANIA, NEW YORK & LONG ISLAND.—This is the corporate name of the tunnel to be built in New York to connect the Pennsylvania and Long Island Railroads. It was incorporated April 21, with $20,000,000 capital, by A. J. Cassatt, John P. Green and other officers of the Pennsylvania. The length of the road is to be about five miles, and the term of its corporate existence is 1,000 years. (See also under Pennsylvania, New Jersey & New York, and under Pennsylvania, Construction Supplement, March 14, 1902.)

PITTSBURGH & LAKE ERIE.—Contracts are reported let for a stretch of road two miles long between Redstone Junction and Brownsville, Pa., affording a connection with the Uniontown Branch of the Pittsburgh, Virginia & Charleston.

PITTSBURGH, SHAWMUT & NORTHERN.—It is said that a line 40 miles long will be built this year to connect with the Pennsylvania and the New York Divisions. Contracts are reported let to the Interior Construction & Improvement Co., of which Frank P. Byrne, of Detroit, Mich., is President. It is thought that sub-contracts will be let as soon as the plans and specifications are ready, and that work will be begun shortly. It is said that a new line is also to be built between Bolivar and Angelica, N. Y., 25 miles.

PITTSBURGH, WESTMORELAND & SOMERSET.—Work is reported again in progress on this line between Ligonier and Somerset, Pa., 21 miles. Fourteen miles were built last fall and are now operated irregularly, but it is proposed to establish a regular passenger schedule June 1.

ST. LOUIS & GULF.—A charter was issued in Missouri April 18 to a company with the above title. The headquarters are in St. Louis and it is proposed to build from Cape Girardeau to the Arkansas State line in Dunklin County, 125 miles. The directors are: I. W. Fristoe, J. H. Allen, C. W. Whitelaw and E. Smith.

SAN PEDRO, LOS ANGELES & SALT LAKE.—Articles of incorporation of this project were filed April 10 in Utah, and specified that a line is to be built from Salt Lake City to a terminal point at East San Pedro, Cal., on San Pedro Bay. Branch lines are to be built to Ivanpah in Tooele County, Utah, and to other points. The length of the line proposed to be built is 1,100 miles, at an estimated cost of $25,000,000. Wm. A. Clark and R. C. Kerens subscribed $1,250,000 each, and the other stockholders took single shares. The company has acquired the Los Angeles Terminal R. R. The officers are: W. A. Clark, President; R. C. Kerens, First Vice-President; J. R. Clark, Second Vice-President; T. E. Gibbon, Third Vice-President; T. F. Miller, Secretary, and F. K. Rule, Treasurer. (Jan. 24, p. 68, with map.)

SCHENECTADY RY. (ELECTRIC).—A proposed extension 14 miles long was filed at Albany April 21, starting at Schenectady and running through the towns of Niskayuna and Glenville in Schenectady County, and in the town of Ballston, Saratoga County. The company operates 10 miles of electric line in Schenectady at present.

SOUTHERN PACIFIC.—Surveys are reported for an extension of the line recently built from Abbeville, La., to Gueydan, which continues it as far as Chloe, which is about 40 miles from Gueydan. It is thought that work will begin on this extension at once. Track laying is reported completed on the line between Gueydan and Abbeville, 25 miles.

At a special meeting of the stockholders, April 16, it was voted to extend the Caney Valley from its present terminus at Van Vleck, Texas, 20 miles into Wharton County. The officers were also authorized to build other branch lines in connection with this. The right of way for this Wharton County extension is reported partially cleared. (March 28, p. 236.)

It is said that the line between Benecia and Sacramento, Cal., 57 miles long, will be double-tracked. It is not known when contracts will be let, but probably not at once.

VIRGINIA ROADS.—Work is reported in progress on a narrow gage line in Bradford County, Va., extending from Coleman's Falls to timber lands owned by John Heald & Co., of Lynchburg, Va.

WABASH.—The work to be done this year includes cutting down the grade on Lodge Hill at Monticello, Ill., to 4 per cent.; the elimination of three grades and shortening of the line 155 ft. in a distance of 1.7 miles. At Bement, Ill., and at Mansfield grades extending between four and five miles are also to be reduced to 4 per cent. A number of trestles are also to be replaced by filling and masonry work and several freight houses are to be built during the year.

WASHINGTON & OREGON.—The line which is being built between Kalama, Wash., and Vancouver along the Columbia River, is now reported completed and application has been made to Congress for permission to bridge the Columbia River at Vancouver, with the intention of extending the branch from Vancouver to Portland, Ore., a distance of about 18 miles. Surveys for this bridge have been made and it is thought that it will be built as soon as Congress has granted the right. It is commonly supposed that the Washington & Oregon is being built in the interest of the Northern Pacific. The distance along the river from Vancouver to Kalama is about 30 miles. (Construction Supplement, March 14, 1902.)

WHITE RIVER (MISSOURI PACIFIC).—An officer sends the following information about the White River R. R., which is being built as an extension of the St. Louis, Iron Mountain & Southern in the interest of the Missouri Pacific. A section from a point about two miles west of Batesville, Ark., to a point just north of Lafferty Creek, with a spur to the Arkansas phosphate mines, a distance of about 17 miles main line, and two miles spur, was completed March 1. Another section from the end of the first 17 miles to a point at or near Buffalo City, Marion County, Ark., is now building. The new line follows the course of the White River all the way from the beginning to the contemplated end, and is located on the north or left bank of the stream. Contract for the part now building has been let to J. H. Reynolds & Co., of Batesville, Ark., with the exception of the steel bridges. The grading of the first 20 miles of this division is about 60 per cent. completed and is progressing favorably. There are only four towns on the new line at present, but new ones are to be laid out when the road is opened. The maximum grades are .3 of 1 per cent., and the maximum curvature is 3 deg. The work in places is quite heavy and a great deal of rock excavation is to be done. There are no large trestles and no tunnels to be built, and only one important steel bridge across the north fork of the White River will be required. The total length of the line will be about 90 miles.

YOUNGSVILLE & SUGAR GROVE (ELECTRIC).—This company was incorporated in Pennsylvania April 14, to build an electric road from the Borough of Youngsville to the Borough of Sugar Grove in Warren County, Pa. Edward D. Wetmore, of Warren, is President, and W. D. Todd, E. E. Allen, H. T. Stone and R. G. Chapel, all of Warren, Pa., are the other directors.

GENERAL RAILROAD NEWS.

CENTRAL NEW ENGLAND.—The final word in the attempt to establish a right of way across the 313 ft. Montague farm has apparently been given by the decision of the Supreme Court of Errors just handed down. Appeal was taken from the decision of Judge Case in the Superior Court on the ground that there had been error in the decision. The Supreme Court finds no error and sustains the demurrer of the defendant. In other words, right of way across the strip cannot be condemned. (Jan. 10, p. 31.)

CHOCTAW, OKLAHOMA & GULF.—At a meeting of the shareholders May 3, the proposition to purchase the property of the Choctaw Northern, which extends from Geary, Okla. T., to Alva, with a branch to Anthony, Kan., a total of 137 miles, will be voted on, and also the contemplated purchase of the Choctaw R. R., formerly the Hot Springs, extending from Hot Springs to Malvern, Ark., with a branch between Benton and Butterfield, a total of about 40 miles. The purchase of the Choctaw, Oklahoma & Gulf by the Chicago, Rock Island & Pacific, mentioned recently, will include the new property. (April 11, p. 278.)

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—The privilege of subscribing at par, pro rata, for $2,000,000 of the new 5 per cent. preferred stock, is offered to holders of the $3,000,000 common stock of record April 19. Subscriptions must be made on or before May 20, at the Treasurer's office in Cincinnati.

ILLINOIS CENTRAL.—Gross receipts from traffic for the eight months ended Feb. 28, 1902, were $27,243,490, and operating expenses and taxes were $18,227,202, leaving net income of $9,016,288 on a mileage increased by 19 over the figure for last year. This shows an increase in gross receipts of $2,606,962, an increase in operating expenses and taxes of $1,277,962, and an increase in net income of $1,329,000.

IOWA ROADS.—The General Assembly of the State of Iowa recently passed a bill to determine the method of reporting gross earnings of companies owning lines of railroad partly within Iowa, and partly outside the State. In this it is prescribed that the aggregate of the earnings upon business originating and terminating within the State, upon business originating in the State and terminating elsewhere, upon business originating elsewhere and terminating in the State, and upon business neither originating nor terminating in the State, but carried on or done over the line or lines in the State or over some part thereof, shall be reported; and with respect to all such interstate business the earnings in the State for the purpose of report shall be actually computed upon the basis of the length of haul or carriage in the State as compared with the length of haul or carriage elsewhere. It is specified that the business done partly within and partly outside the State shall be considered that proportion of the entire earnings of such business as the haul within the State bears to the total haul.

The Assembly also ordered that any railroad corporation organized under the Iowa laws and owning and operating a railroad within the State, shall be authorized to exercise the powers conferred on it by its articles of incorporation in any other State where its lines extend, and that any corporation so organized may lease or acquire any connection which is not parallel or competing, and to that end may purchase and control the stock and securities of any such extension, if not contrary to the laws of such other State. This was approved April 11.

LONDON UNDERGROUND ROADS.—Testimony was given in London April 22 by Clinton E. Dawkins, of the English Morgan firm, before the House of Lords Committee which is investigating the question of underground transit of London. It is proposed to build a new system entirely, to act independently of the Yerkes scheme, and to be guaranteed by the Morgans in connection with Siemens and other British interests.

NATIONAL OF MEXICO.—A circular letter under date of April 10 states that the National of Mexico assumed ownership and control of all the railroad lines and property of the Mexican National on that date. (April 18, p. 296.)

NORTHERN SECURITIES.—The United States Supreme Court on April 21 granted leave to the State of Washington to file an original bill for an injunction against the Great Northern, the Northern Pacific and the Northern Securities Co. This affects in no way the merits of the case but simply involves question of jurisdiction.

ST. LOUIS, MEMPHIS & SOUTHEASTERN.—This company has purchased the Crystal R. R., formerly owned by the Pittsburgh Plate Glass Co. It extends from Crystal City to Silica, Mo., four miles. (Construction Supplement, March 14, 1902.)

WASHINGTON (D. C.) TERMINAL.—At a recent meeting of the Board of Trade in the city of Washington, considerable opposition to the bill now before Congress to provide for a union passenger station, was presented. The speaker, Mr. Millard, representing the citizens of the northeastern part of the city, said that Congress had exceeded its constitutional powers in granting right of way, and in leaving the decision of certain questions of right of way to the courts to settle. The bill was also objected to because it requires the District of Columbia to allow the Pennsylvania a large sum for the relinquishment of its right to the route leading to the present station at Sixth street. It is claimed that the company has no vested right in this land. The bill was objected to as a whole because it creates a monopoly in perpetuity. The Government should forever retain all rights of this kind in the District of Columbia, the fundamental duty being to make military defense the main thing in the construction of public works.